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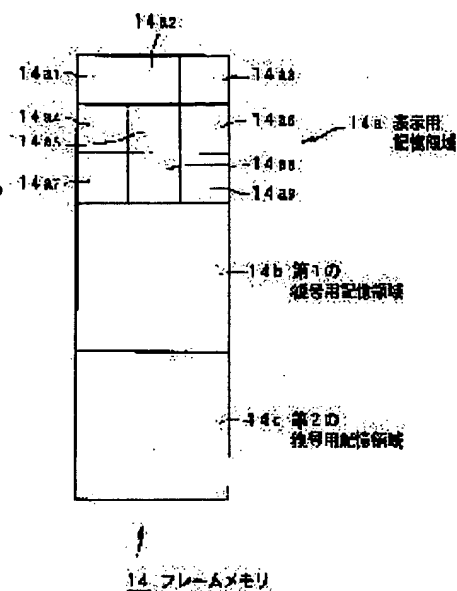
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(54) SIGNAL REPRODUCING DEVICE AND METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a DVD reproduction device by which video images photographed at a plurality of angles recorded on a DVD are viewed without seam simultaneously or momentarily every time they are switched.

SOLUTION: A frame memory used for decoding video images in a DVD reproducing device that reproduces a DVD is made up of a display storage area 14a consisting of 9 storage areas corresponding to display of nine different video images such as video images at nine different angles and of a 1st decoding storage area 14b and a 2nd decoding storage area 14c that store I and P pictures after decoding, that is, decoded image data.



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CLAIMS

[Claim(s)]

[Claim 1] The read-out means which reads the coded-image data of the image of the above-mentioned two or more angle types from the record medium with which it is recorded, the image of two or more angle types being used as coded-image data, with a decode means to decode the above-mentioned coded-image data of the angle type of one of the above-mentioned two or more angle types which carried out reading appearance and which carried out [above-mentioned] reading appearance with the means, and to generate the decode image data of the above-mentioned two or more angle types A storage means for decode to memorize the above-mentioned decode image data of the angle type of one of the above-mentioned two or more angle types generated with the above-mentioned decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, Cutback processing is performed to the above-mentioned decode image data memorized by the above-mentioned storage means for decode. Signal regeneration equipment characterized by having the control means which reads the display image data containing the above-mentioned decode image data which wrote this decode image data that carried out cutback processing in the above-mentioned storage region of the above-mentioned storage means for a display, and was written in this above-mentioned storage region.

[Claim 2] Signal regeneration equipment according to claim 1 characterized by having at least one above-mentioned storage means for decode, decoding the coded-image data in a frame of the above-mentioned coded-image data using the one above-mentioned storage means for decode, and reproducing the image of the above-mentioned two or more angle types currently recorded on the above-mentioned record medium.

[Claim 3] Signal regeneration equipment according to claim 1 characterized by having at least two above-mentioned storage means for decode, decoding the inter-frame forward direction coded-image data of the above-mentioned coded-image data using the two above-mentioned storage means for decode, and reproducing the image of the above-mentioned two or more angle types currently recorded on the above-mentioned record medium.

[Claim 4] Signal regeneration equipment according to claim 1 characterized by having at least three above-mentioned storage means for decode, decoding the inter-frame forward direction coded-image data of the above-mentioned coded-image data using the three above-mentioned storage means for decode, and carrying out hard flow playback of the image of the above-mentioned two or more angle types currently recorded on the above-mentioned record medium.

[Claim 5] The read-out means which reads the above-mentioned coded-image data of the above-mentioned two or more angle types from the record medium with which the image of two or more angle types is recorded as coded-image data, the signal regeneration equipment characterized by having m storage means to memorize the above-mentioned coded-image data which carried out reading appearance, and which carried out [above-mentioned] reading appearance with the means, and a decode means to decode the above-mentioned coded-image data outputted from the m above-mentioned storage means, and to generate decode image data.

[Claim 6] Signal regeneration equipment according to claim 5 characterized by carrying out change ***** of the above-mentioned decode image data of each angle type which was equipped with the m above-mentioned decode means, and was decoded and obtained with each of this m decode means by the transfer switch.

[Claim 7] The above-mentioned decode means is signal regeneration equipment according to claim 5 characterized by switching and inputting the coded-image data of the above-mentioned two or more angle types which have the processing speed of m times as many decode as this, and were outputted from the m above-mentioned storage means.

[Claim 8] Signal regeneration equipment according to claim 5 characterized by mixing and outputting the above-mentioned decode image data of each angle type which was equipped with the m above-mentioned decode means, and was decoded and obtained with each of this m decode means by the mixing circuit.

[Claim 9] Signal regeneration equipment according to claim 8 characterized by having the switch which carries out the output control of the above-mentioned decode image data of each angle type decoded and obtained with each m above-mentioned decode means, and is sent to the above-mentioned mixing circuit.

[Claim 10] The read-out process which reads the coded-image data of the image of the above-mentioned two or more angle types from the record medium with which it is recorded, the image of two or more angle types being used as coded-image data, with the decode process which decodes the above-mentioned coded-image data of the angle type of one of the above-mentioned two or more angle types which carried out reading appearance, and which carried out [above-mentioned] reading appearance at the process, and generates the decode image data of the above-mentioned two or more angle types The decode image data storage process of memorizing the above-mentioned decode image data of the angle type of one of the above-mentioned two or more angle types generated according to the above-mentioned decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, Cutback processing is performed to the above-mentioned decode image data memorized at the above-mentioned decode image-TA storage process. The signal regeneration approach carried out [having the control process which reads the display image data containing the

above-mentioned decode image data which wrote in the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region, and] as the description.

[Claim 11] the signal-regeneration approach which carries out reading appearance and which carries out [having m steps of the storage processes of memorizing the coded-image data above-mentioned / which reads two or more kinds of the above-mentioned coded-image data / which carried out reading appearance, and which carried out / above-mentioned / reading appearance at a process to a process, and the decode process which decode the above-mentioned coded-image data outputted from the m above-mentioned steps of storage processes, and generate decode image data from the record medium with which the image of two or more angle types is recorded as coded-image data and] as the description.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the signal regeneration equipment and the approach of reproducing two or more dynamic images which have the same attribute especially about the signal regeneration equipment and the approach of decoding the coded-image data which constitute a dynamic image, and reproducing a dynamic image.

[0002]

[Description of the Prior Art] Carrying out random access is mentioned as a description common to an optical disk. Taking advantage of this description, as for DVD (digital video disc: DVD-VIDEO) which is an optical disk, the multi-angle-type function, the multi-story function, etc. are incorporated.

[0003] The above-mentioned multi-angle-type function is a function which reproduces the image simultaneously photoed from the camera angle from which plurality differs, for example, is a function which makes refreshable the image of two or more angle types to the image of 1.

[0004] the angle type of the above-mentioned plurality [DVD] — selection — the data made refreshable are constituted as angle iron. Angle iron makes the image data of each angle type a fragment, is formed, in DVD, the so-called interleave structure is used for it, mixes each angle iron, and is recording it on the signal recording surface. DVD is adopting the record structure of such data, and is realizing the above-mentioned multi-angle-type function and the multi-story function.

[0005] A DVD regenerative apparatus can reproduce the above DVDs, for example, and can switch and reproduce them on real time on the image of an angle type to see during playback.

[0006] in addition, seamlessness and the angle iron (henceforth SML_AG_BLK) which it is alike and can be connected about other angle types, and the other angle iron — that is, — non — there is angle iron (henceforth NSML_AGL_BLK) to which that it is only seamless can switch an angle type. [be / when the image of those with two kind and synchronization is switched to the above-mentioned angle iron / namely, / no break]

[0007]

[Problem(s) to be Solved by the Invention] By the way, when above-mentioned SML_AG_BLK is reproduced, the above-mentioned DVD regenerative apparatus will take [after switching an angle type] the time amount of a divisor second to change, although an angle type can be switched seamlessly. That is, as for the above-mentioned DVD regenerative apparatus, playback of another angle type of a flash cannot do an angle type the method of a switch, and the bottom, therefore — when a viewer wants to see the image of other angle types, even if it switches — the switched flash — being concerned — others — the image of an angle type will not be able to be seen but an image to see will be overlooked.

[0008] Furthermore, in playback of above-mentioned SML_AG_BLK, the angle type is restricted to the switch at once at the divisor second. And in all angle types, the subimage data which consist of audio data, title information, etc. are encoded only within the thing concerning the image of the angle type reproduced.

[0009] Moreover, when above-mentioned NSML_AG_BLK is reproduced, once the above-mentioned DVD regenerative apparatus sometimes stops playback the method of a switch, and the bottom, it must change an angle type to another angle type, and must resume playback. Thus, the image with which each angle type is not connected smoothly is not seen for a viewer, but serves as that of *****.

[0010] In addition, in playback of above-mentioned NSML_AG_BLK, another angle type of a flash is [an angle type] reproducible the method of a switch, and the bottom. Many [moreover, / more generally / the location which can switch an angle type / than above-mentioned SML_AG_BLK] furthermore — even if it switches to the image of other angle types — being concerned — others — audio data different from an image and subimage data of an angle type can be decoded.

[0011] When playback of above-mentioned NSML_AG_BLK and NSML_AG_BLK is performed, even if a DVD regenerative apparatus is able to switch an angle type, it cannot switch an angle type to sault MURESU and an instant.

[0012] Moreover, if a viewer can be simultaneously provided with the graphic display of each angle type for example, each angle-type image can always be checked and overlooking of the image by switch of each angle type and the difficulty of seeing can be canceled as mentioned above. Therefore, offer of the equipment which makes it possible to display the image of two or more angle types simultaneously is also desired.

[0013] then — even if it switches the image of two or more angle types which this invention is made in view of the above-mentioned actual condition, and are recorded on the record medium simultaneous — an instant — a sault — it aims at offering the signal regeneration equipment and the approach of seeing a MURESU image.

[0014]

[Means for Solving the Problem] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types, in order to

solve an above-mentioned technical problem A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, It has the control means which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized by the storage means for decode, wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region. By having these, signal regeneration equipment memorizes two or more decode image data to each storage region of the storage means for a display.

[0015] moreover, the signal regeneration equipment concerning this invention is equipped with m storage means to memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means to decode the above-mentioned coded-image data outputted from m storage means, and to generate decode image data in order to solve an above-mentioned technical problem. By having these, signal regeneration equipment is switched simultaneous and decodes the coded-image data of two or more angle types.

[0016] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, It has the control process which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized at the decode image data storage process, wrote in the storage region where the storage process for a display has this decode image data that carried out cutback processing, and was written in this storage region.

[0017] moreover, the signal regeneration approach concerning this invention has m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data, in order to solve an above-mentioned technical problem.

[0018]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing.

[0019] The gestalt of the 1st operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD (digital video disc: DVD-VIDEO) might be reproduced first.

[0020] in addition, I picture and the inter-frame forward direction predicting-coding image which consist of a coded image in a frame as data which DVD is a record medium with which the image compression coding was carried out [the image] by MPEG 2 (Moving Picture Coding Experts Group 2) is recorded, and constitute image data — P picture [from] and B picture which consists of a bidirectional predicting-coding image are recorded.

[0021] Without performing predicting coding, the above-mentioned I picture carries out compression coding, can make one image, is **** coded-image data and generates an image by decode of only data itself. The above-mentioned P picture is coded-image data made from the image in the frame in front of one by carrying out predicting coding. The above-mentioned B picture is coded-image data made from the image in the frame of order by carrying out predicting coding.

[0022] That is, in case it decodes, I picture does not need other coded-image data, and P picture or B picture needs one or two coded-image data for others. Decode of these coded-images data is performed by the data decoder on the frame memory of a DVD regenerative apparatus.

[0023] The DVD regenerative apparatus which reproduces Above DVD divides and constitutes the frame memory 14 used in case it decodes, as shown in drawing 1 to three fields. A frame memory 14 has 1st storage region 14for decode b and 2nd storage region 14c for decode which remember I picture after decode, and P picture, i.e., decode image data, to be storage region 14a for a display which corresponds to the display of nine different images, for example, image [of the angle type of nine directions] **, and forms nine storage regions, and is constituted.

[0024] I picture or P picture is memorized as mentioned above by storage region 14for decode a of the above 1st, and 2nd storage region 14for decode b. For example, when decoding P picture, it decodes using the decode image data of I picture after the decode which memorizes the P picture concerned to either 1st storage region 14for decode b, or 2nd storage region 14c for decode, and is memorized in the decode storage region of another side, or P picture.

[0025] And the decode image data which consists of I picture or P picture decoded in 1st storage region 14for decode a or the 2nd storage region for decode is memorized to the field to which cutback processing was performed and it was divided in the above-mentioned storage region 14a for a display.

[0026] The above-mentioned storage region 14a for a display is a field which memorizes display image data. It divides into nine fields 14a1, 14a2, 14a3, 14a4, 14a5, 14a6, 14a7, 14a8, and 14a9 corresponding to displaying the image of nine ANGU, and it is constituted so that the above-mentioned decode image data by which the above-mentioned cutback processing was performed to each of this field may be memorized.

[0027] In addition, the image data in storage region 14a for a display is reproduced by the monitor by playback of display-image data. Moreover, the mode of the storage region of storage region 14a for a display can be chosen as arbitration. In this case, the above-mentioned decode image data memorized in the storage region formed in the selected mode is reproduced as an image with the above-mentioned display screen data by the part corresponding to the above-mentioned storage region of display screens, such as a monitor.

[0028] For example, in playback by multi-angle-type functional activation, each decode image data which constitutes the image of the angle type of this time of day to each above-mentioned field is memorized, respectively. For example, the decode image data concerning the image of the 1st angle type thru/or the 9th angle type is assigned and memorized to nine fields.

[0029] Thus, by having the constituted frame memory 14, for example, a DVD regenerative apparatus can display the image which decoded the coded-image data which constitute the image of two or more angle types memorized by DVD, these-decoded at once, and was acquired on each display of a monitor.

[0030] Hereafter, the above-mentioned frame memory 14 is explained in more detail using the DVD regenerative apparatus 1 constituted as shown in drawing 2.

[0031] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium (DVD) 100 as shown in drawing 2. The RF circuit 3 which the RF signal reproduced by this pickup 2 is supplied, and performs binary-ized processing of this RF signal etc., It has the data decoder 4 which the playback data from the RF circuit 3 are supplied, and carries out decoding, such as an error correction, and the demultiplexer 5 which distributes the playback data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.

[0032] In addition, the above-mentioned main image compressed data is constituted by coded-image data, such as the above-mentioned I picture, P picture, and B picture.

[0033] Moreover, the video decoder 6 which decodes the above-mentioned main image compressed data which the DVD regenerative apparatus 1 was equipped with the above-mentioned frame memory 14, and was outputted from the demultiplexer 5. The subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the above-mentioned main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.

[0034] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.

[0035] Moreover, the NTSC signal or PAL signal from the NTSC conversion circuit 9 outputted from the DVD regenerative apparatus 1 is inputted into a monitor 200, and is converted into a video signal.

[0036] In addition, as shown in drawing 14, it is recorded by Video Object Set (henceforth VOBS), the record medium 100 which this DVD regenerative apparatus 1 reproduces being used as the unit of one work of a film etc.

[0037] Above VOBS consists of two or more Video Object (henceforth VOB). DVD is constituted so that it may become story expansion different the whole above VOB corresponding to the multi-strike-Li function in which he can see one film by two or more story expansions. And VOB is constituted by two or more Cell(s).

[0038] Above Cell serves as units, such as one scene in a film. That is, the combination for every scene of this serves as VOB, and constitutes the above-mentioned multi-strike-Li function etc. by the difference in this combination. And Cell is constituted by two or more Video Object Unit (henceforth VOBUnit).

[0039] Above VOBUnit consists of groups of two or more main image compressed data, subimage compressed data, and speech compression data. the main image compressed data, subimage compressed data, or speech compression data is mentioned later — as — the main imagery pack (V_PCK) from a demultiplexer 5, a subimagery pack (SP_PCK), or a voice pack (A_PCK) —
***** — it is-izing and outputted.

[0040] The above-mentioned main image compressed data is data used as the main image of a film, and constitutes the video stream in a DVD format. Moreover, subimage compressed data is data, such as a title, and constitutes the subpicture stream in a DVD format. And speech compression data are data about voice, and constitute the audio stream in a DVD format.

[0041] Here, in DVD, the image data of each angle type are made into the angle iron which it comes to make into a fragment, and interleave structure is used for GOP (Group of Picture) as used in the field of an MPEG 2 method, it mixes angle iron, and is recorded on DVD. For example, in 1VOBU, interleave structure is used for GOP and it is recorded. And as shown in drawing 15, 1GOP is constituted by I picture, P picture, and B picture, and it is usually constituted so that these I picture, P picture, and B picture may become 15 sheets in total.

[0042] Reading appearance of the data is carried out by the pickup 2 whose DVD regenerative apparatus 1 is equipped with the record medium (DVD) 100 with which data were recorded by the above-mentioned format.

[0043] Pickup 2 irradiates the laser beam from the laser light source included in the pickup 2 concerned at the signal recording surface of a record medium 100, and receives the reflected light reflected by the signal recording surface. Pickup 2 supplies the RF signal reproduced according to the light which received light to the RF circuit 3.

[0044] The RF circuit 3 carries out waveform equalization of this RF signal, binary-ization, etc., and generates playback data, its synchronizing signal, etc. The digital data generated by this RF circuit 3 is supplied to a data decoder 4.

[0045] A data decoder 4 processes a recovery, an error correction, etc. of data based on the playback data generated by the RF circuit 3. The digital data with which the recovery etc. was carried out by the data decoder 4 is supplied to a demultiplexer 5.

[0046] Here, the main image compressed data is contained in the digital data. Therefore, it means that reading appearance of the coded-image data had been carried out by pickup 2, the RF circuit 3, and the data decoder 4 from the record medium 100.

[0047] A demultiplexer 5 divides into various packs, i.e., the main imagery pack, a subimagery pack, or a voice pack the digital data reproduced from the record medium 100 with which decoding of an error correction etc. was performed by the data decoder 4, and outputs each pack concerned to each latter decoder.

[0048] In addition, in order to absorb the processing speed of a demultiplexer 5 and the above-mentioned data decoder 4, the track buffer is prepared between the demultiplexer 5 and the data decoder 4.

[0049] A demultiplexer 5 supplies the main imagery pack which consists of main image compressed data to the video decoder 6, supplies the subimagery pack which consists of a subimage compression pack to the subimage decoder 7, and supplies the voice

pack which consists of a speech compression pack to the audio decoder 8.

[0050] The video decoder 6 performs decode processing of the main image compressed data in the supplied main imagery pack, and generates the main image data expanding-ized by this decode processing. Here, the main image data are decode image data made into decoded I picture, P picture, and B picture. And the video decoder 6 has the above-mentioned frame memory 14, in order to perform decode processing.

[0051] Here, the 9th I picture or I picture, and P picture of an image of a multi-angle type in VOBUs are decoded, for example, and the case which performs forward direction playback where it is constituted possible [activation of for example, a multi-angle-type function] by the decode processing which the above-mentioned video decoder 6 performs using the above-mentioned frame memory 14 is explained. In addition, the case where the sequential decode of the I picture I2 in the 1st VOBUs and 2nd VOBUs is carried out about decode of the above-mentioned I picture is explained. Moreover, the case where the sequential decode of the I picture I2 in 1st VOBUs, the P picture P5, and the P picture P8 is carried out about decode processing of the above-mentioned I picture and P picture is explained.

[0052] When decoding only I picture, as shown in drawing 3 (a), the video decoder 6 decodes the I picture I2 of the inside which constitutes the inputted main image compressed data, and memorizes it to 1st storage region 14b for decode of a frame memory 14. The video decoder 6 performs decode of the I picture I2, rewriting on 1st storage region 14b for decode.

[0053] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 3 (b).

[0054] The memorized I picture I2 by which cutback processing was carried out at the above-mentioned storage region 14a for a display is projected on the display by which the monitor 200 was divided through the above-mentioned subimage decoder 7 and the NTSC conversion circuit 9 as an image.

[0055] While the DVD regenerative apparatus 1 projects the generated image by the decoded I picture I2, as shown in drawing 3 (c), it memorizes the I picture I2 currently recorded on 1st storage region 14b for decode of a frame memory 14 in the following I picture and VOBUs of ***** 2nd. Here, with having carried out by the I picture I2 of the 1st VOBUs, similarly, the video decoder 6 decodes the I picture I2 of this 2nd VOBUs, performs cutback processing after that, and copies it to storage region 14a for a display.

[0056] It projects in a monitor 200, the I picture I2 of the 2nd VOBUs which cutback processing was carried out and was copied to the above-mentioned storage region 14a for a display being used as the next image of the I picture I2 of the 1st above VOBUs. The decode image data (the main image data) decoded and obtained in the video decoder 6 in detail as mentioned above is supplied to the subimage decoder 7.

[0057] The subimage decoder 7 performs decode processing of the subimage compressed data in the supplied subimagery pack, compounds it to the above-mentioned main image data to which the subimage data which carried out this decode processing were supplied from the video decoder 6, and generates image data. That is, the subimage decoder 7 compounds the title data reproduced as subimage data with the above-mentioned main image data. In addition, this subimage decoder 7 outputs the main image data as image data as it is, when there are no subimage data. The subimage decoder 7 supplies the generated image data to the NTSC conversion circuit 9.

[0058] The NTSC conversion circuit 9 changes image data into television signals, such as NTSC and PAL, from digital data. The television signal from the NTSC conversion circuit 9 is projected on a monitor 200 as an image.

[0059] The I picture I2 decoded by the above-mentioned video decoder 6 is contained in the television signal inputted into the monitor 200. Moreover, corresponding to two or more storage regions where storage region 14a for a display of the above-mentioned frame memory 14 was divided, as for a monitor 200, a division indication of the display screen is given nine. Here, a division display follows the division mode of for example, the storage region for a display. Therefore, the image based on the above-mentioned I picture I2 projects on the display of 1 which comes to divide the display screen of a monitor 200.

[0060] In addition, the audio decoder 8 generates the voice data which performed decode processing of the speech compression data in a voice pack, and was elongated. That is, if voice data is compressed by the MPEG 2 method, the audio decoder 8 will carry out expanding processing corresponding to this, and will generate speech compression data. Moreover, besides a format of MPEG 2, if the audio decoder 8 is a format of Linear PCM or DORUBI AC 3, it will perform processing corresponding to this. The audio decoder 8 supplies the generated voice data to the A/D-conversion circuit 10.

[0061] The A/D-conversion circuit 10 changes and outputs the voice data which is digital data to the voice data of an analog. By supplying this output to a loudspeaker etc., a user can view and listen to the image reproduced from the record medium 100.

[0062] A controller 11 performs control of pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10. Moreover, to this controller 11, an actuation input is carried out through the user interface 12 which are a control panel and a remote controller, and each circuit is controlled for it based on this actuation input.

[0063] This controller 11 performs write-in control by the frame memory 14, and read-out control through the video decoder 6. Namely, a controller 11 controls by writing in the storage region of 1 formed for the division display of cutback processing of the decode image data memorized in the storage region for decode of a frame memory 14, and the decode image data concerned of 1 which carried out cutback processing of storage region 14a for a display. And a controller 11 performs read-out control which the decode image data memorized in storage region 14a for a display reads.

[0064] In addition, read-out from display storage region 14a of decode image data is performed by read-out of the display image data of a display storage region 14a unit. The image by the decode image data memorized by up Norikazu's storage image with display-image data corresponding to [200] the above-mentioned storage region projects on the display position corresponding to the storage region concerned of a monitor.

[0065] Therefore, the DVD regenerative apparatus 1 can project simultaneously the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on a monitor 200 by performing similarly the decode and cutback

processing which were performed to I picture of the 9th above-mentioned angle type to the 1st thru/or I picture of the 8th angle type. As shown in drawing 5 R> 5 (a) thru/or drawing 5 (d), a procedure which generates the image (200a) of the 1st angle type, the image (200b) of the 2nd angle type,, the image (200i) of the 9th angle type, and the image (200a) of the 1st angle type performs decode of the coded-image data which constitute the image of each angle type in this case.

[0066] In addition, if I picture is only decoded, the frame memory 14 should just be equipped with at least one storage region for decode as mentioned above.

[0067] Moreover, about the case of decode of I picture and P picture, as shown in drawing 4 (a), the inputted I picture I2 decodes the video decoder 6 first, and it is memorized by 1st storage region 14b for decode of a frame memory 14.

[0068] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 4 (b).

[0069] The image generated by the I picture I2 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected on the display of 1 of the monitor 200 corresponding to storage region 14a for a display of a frame memory 14.

[0070] On the other hand, as shown in drawing 4 (c), the video decoder 6 predicts and decodes the P picture P5 inputted into the degree by the I picture I2 after the decode memorized by 1st storage region 14b for decode, and memorizes it to 2nd storage region 14c for decode.

[0071] After memorizing the P picture P5 after decode to 2nd storage region 14c for decode, the video decoder 6 copies the P picture P5 after the decode which performed cutback processing to the decoded P picture P5, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (d).

[0072] The image generated by the P picture P5 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned I picture I2 projected on the display of up Norikazu of a monitor 200.

[0073] In case the P picture P8 is decoded, as shown in drawing 4 (e), the video decoder 6 predicts and decodes the P picture P8 inputted into the degree by the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and memorizes it to 1st storage region 14b for decode.

[0074] After memorizing the P picture P8 after decode to 1st storage region 14b for decode, the video decoder 6 copies the P picture P8 after the decode which performed cutback processing to the decoded P picture P8, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (f).

[0075] The image generated by the P picture P8 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned P picture P5 projected on the display of up Norikazu of a monitor 200.

[0076] Therefore, it means that the image based on I picture and P picture which were decoded had projected on the display of up Norikazu of a monitor 200 one after another.

[0077] The DVD regenerative apparatus 1 can project the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on each display to which the monitor 200 corresponded by performing similarly the above-mentioned decode and the cutback processing which were performed to the 9th I picture and P picture of an angle type to I picture and P picture of the 1st thru/or the 8th angle type.

[0078] The forward direction playback performed by decode of only above-mentioned I picture or I picture, and P picture is applied when performing for example, high-speed playback. Moreover, what is necessary is just to establish the storage region for decode in a frame memory 14 further, if the usual playback is performed.

[0079] Moreover, the DVD regenerative apparatus 1 can also perform hard flow playback, and can also project the image of the 1st thru/or the 9th angle type of this time of day on a monitor 200 as mentioned above. For example, hard flow playback using I picture is performed by decoding I picture in GOP as I picture in the n-1st VOB(s) is decoded, after decoding I picture in n-th VOB.

[0080] And the hard flow playback using I picture and P picture decodes I picture by 1st storage region 14b for decode first, and decodes P picture based on it in the 2nd storage region for decode. For example, the I picture I2 is decoded by 1st storage region 14c for decode. Decode processing is performed as the P picture P5 in the same VOB is decoded by 2nd storage region 14c for decode based on the decoded I picture I2. Hard flow playback is performed by giving an indication to a monitor 200 the order of decode at reverse, namely, reproducing in order of the P picture P5 and the I picture I2.

[0081] next, the DVD regenerative apparatus 1 — hard flow — the case where I picture and P picture which constitute the image of the 9th angle type are decoded about the frame memory 14 constituted refreshable is explained.

[0082] hard flow — as shown in drawing 6, the frame memory 14 constituted refreshable has 1st decode storage region 14b which remembers the decode image data after decode of I picture or P picture to be storage region 14a for a display which forms nine storage regions, 2nd decode storage region 14c, and 14d of 3rd storage region for decode, and is constituted.

[0083] That is, when applying to hard flow playback, 14d of 3rd storage region for decode is further established in a frame memory 14.

[0084] When carrying out hard flow playback, as shown in drawing 7 (a), the inputted I picture I2 is decoded and it memorizes to 1st storage region 14b for decode of a frame memory 14.

[0085] Then, the P picture P5 inputted into the degree is decoded by prediction using the I picture I2 after the decode memorized by 1st storage region 14b for decode, and the video decoder 6 memorizes it to 2nd storage region 14c for decode, as shown in drawing 7 (b).

[0086] Furthermore, after that, the P picture P8 inputted into the degree is decoded by prediction using the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and the video decoder 6 memorizes it to 14d of 3rd storage region for decode, as shown in drawing 7 (c).

[0087] And each decode copy of data to storage region 14a for a display is performed in order of having processed the above-mentioned decode and reverse. That is, as shown in drawing 7 (d), the P picture P8 after the decode which performed cutback processing to the P picture P8 after the decode memorized first at 14d of 3rd storage region for decode, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display is copied.

[0088] Next, as shown in drawing 7 (e), the P picture P5 after the decode which performed cutback processing to the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.

[0089] And as shown in drawing 7 (f), the I picture I2 after the decode which performed cutback processing to the I picture I2 after the decode memorized by 1st storage region 14b for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.

[0090] As mentioned above, the DVD regenerative apparatus 1 can indicate the image of the P picture P8, the P picture P5, and the I picture I2 by sequential at the display of 1 of the monitor 200 corresponding to the above-mentioned field 14a9 by carrying out the sequential copy of the P picture P8, the P picture P5, and the I picture I2 to the field 14a9 of storage region 14a for a display.

[0091] In addition, the hard flow playback performed by decode of only above-mentioned I picture and P picture is applied when performing for example, high-speed reverse playback. Moreover, what is necessary is just to establish one storage region for decode in a frame memory 14, if the usual hard flow playback is performed.

[0092] As mentioned above, it is explanation in the case of performing hard flow playback using the frame memory 14 constituted so that decode of only I picture or I picture, and P picture might perform, and this frame memory 14.

[0093] The DVD regenerative apparatus 1 is having the frame memory 14 constituted as mentioned above, and it becomes possible in forward direction playback and hard flow playback to display simultaneously the image of two or more angle types which can be set at this time of day.

[0094] The problem of overlooking the image of other switched momentary angle types which were made into the problem in the seamless image switch thereby, for example is also solvable. For example, a viewer can also see simultaneously the image of other angle types [can see a seamless image and] to see.

[0095] in addition — not only an image with the seamless image of the angle type to reproduce — non, you may be a seamless image.

[0096] Moreover, the image of each angle type is constituted as for example, 1VOBU unit, and the image of each angle type of the image of this time of day has an attribute between each VOB further. That is, the DVD regenerative apparatus 1 has decoded the picture in each VOB by which matching was carried out [above-mentioned] in playback of the image of each angle type.

[0097] However, it is not limited to this, but it is for example, at the forward direction playback time, and the DVD regenerative apparatus 1 can also decode the picture which constitutes the image of an angle type besides the above of VOB belonging to the next time of day, when decoding the picture of the image of other angle types. Moreover, it is the DVD regenerative apparatus 1 at the hard flow playback time, and when decoding the picture of the image of other angle types, it can also decode the picture which constitutes the image of an angle type besides the above of VOB belonging to true time of day.

[0098] Next, the gestalt of the 2nd operation is explained. The gestalt of the 2nd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.

[0099] In addition, DVD consists of data formats which have a multi-angle-type function like the gestalt of the 1st operation of a ****. That is, the MPEG 2 method is used for DVD, and it carries out compression coding as I picture, P picture, and a B picture, and is recording the image. The case where DVD with which the image of two different angle types is recorded hereafter is reproduced is explained.

[0100] As shown in drawing 8 , a DVD regenerative apparatus is equipped with two video decoders, switches the output of the decode image data decoded and obtained by this two video decoder, and is outputting it to the latter circuit.

[0101] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium 100 in detail, The RF circuit 3 which the RF signal reproduced by this pickup 2 is carried out, and performs binary-ized processing for this RF signal, The data decoder 4 which the playback data from the RF circuit 3 etc. are supplied, and carries out decoding, such as an error correction, The track buffer 21 which memorizes the digital data which has the 1st storage region 21a and 2nd storage region 21b, and was outputted from the data decoder 4, It has the demultiplexer 5 which distributes the digital data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.

[0102] Moreover, the 1st video decoder 22 and the 2nd video decoder 23 which decode the above-mentioned main image compressed data with which the DVD regenerative apparatus 1 was outputted from the demultiplexer 5, The subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.

[0103] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the 1st video decoder 22, the 2nd video decoder 23, a transfer switch 24, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.

[0104] The data decoder 4 which decodes the playback data by which signal processing was carried out in the pickup 2 which reproduces a RF signal from the above-mentioned record medium 100, the RF circuit 3 which carries out signal processing of this RF signal, and the RF circuit 3 is constituted so that each can usually make processing speed processing [twice]. Here, processing when processing reads a part for the image of one angle type from a record medium 100, for example is usually said.

[0105] Moreover, the above-mentioned demultiplexer 5 is also constituted so that processing speed of data can usually be made into processing [twice]. Thereby, a demultiplexer 5 can perform distribution of the main image compressed data inputted, subimage compressed data, and speech compression data, without differing from the above-mentioned usual processing.

[0106] Hereafter, the component of the above-mentioned DVD regenerative apparatus 1 is explained. In addition, about the part explained with the DVD regenerative apparatus 1 used as the gestalt of the 1st operation, the same number as drawing 2 is attached and the explanation is omitted.

[0107] The DVD regenerative apparatus 1 inputs into a track buffer 21 the coded-image data currently recorded on the record medium 100 through pickup 2, the RF circuit 3, and a data decoder 4.

[0108] The above-mentioned track buffer 21 has two storage regions, the 1st storage region 21a and 2nd storage region 21b. A track buffer 21 memorizes the digital data inputted into each above-mentioned storage region. Here, the digital data contains the main image compressed data divided by the demultiplexer 5, subimage compressed data, and speech compression data, as mentioned above.

[0109] This track buffer 21 is absorbing the difference in the processing speed of the above-mentioned data decoder 4 and a demultiplexer 5. And a track buffer 4 outputs digital data to the demultiplexer 5 concerned by the move instruction from a demultiplexer 5.

[0110] The demultiplexer 5 usually has one twice the processing speed of processing speed, as mentioned above. A demultiplexer 5 incorporates by turns the digital data outputted from each above-mentioned storage region of a track buffer 21, divides the incorporated digital data into the main image compressed data, subimage compressed data, and speech compression data, and outputs it to the 1st video decoder 22 or the 2nd video decoder 23, the subimage decoder 7, and the voice decoder 8.

[0111] The main image compressed data outputted to the 1st video decoder 22 and the 2nd video decoder 23 is the so-called coded-image data, and is data constituted by the so-called I picture, P picture, and B picture. And an output is performed to each above-mentioned video decoder 6 so that it may become for example, 1GOP unit. Moreover, the above-mentioned main image compressed data, subimage compressed data, and speech compression data are supplied to each decoder with which it was pack-ized and the latter part of a demultiplexer 5 was equipped.

[0112] In addition, it has the frame memory equipped with three storage regions for decode for decode of I picture, P picture, and B picture, respectively in the 1st video decoder 22 and the 2nd video decoder 23.

[0113] The 1st video decoder 22 and the 2nd video decoder 23 decode each inputted coded-image data. Inter-frame prediction performs decode processing performed here. The decode image data decoded by this 1st video decoder 22 and the 2nd video decoder 23 is inputted into a transfer switch 24.

[0114] A transfer switch 24 supplies either of the decode image data from the video decoder 22 of the above 1st, or the 2nd video decoder 23 to the latter subimage decoder 7. Switching of a transfer switch 24 is performed by the controller 11.

[0115] For example, the data to which a transfer switch 24 outputs an instruction of a switch during the output of the decode image data from the 1st video decoder 21 by switch actuation a carrier beam case are switched to decode image data from the 2nd video decoder 23. Therefore, the coded-image data decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 are switched by this transfer switch 24 in an instant so that either may be outputted. For example, such switching is performed in the case of a switch of the image of an angle type.

[0116] The decode image data outputted through the above-mentioned transfer switch 24 is displayed on a monitor 200 as an image through the subimage decoder 7 and the NTSC conversion circuit 9.

[0117] Therefore, since it can switch in an instant and can reproduce on the image of other angle types during playback of the image of the angle type of 1, the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation can display the image of other angle types of the switched flash concerned on a monitor 200.

[0118] with this DVD regenerative apparatus 1, a viewer wants to see, when it switches to the image of other angle types — being concerned — others — overlooking the image of an angle type is lost.

[0119] not only an image with the seamless image of an angle type here — non, you may be a seamless image, and regardless of the class of these images, the DVD regenerative apparatus 1 can be switched in an instant, and can be reproduced.

[0120] In addition, even if it switches to the image of an angle type besides the above, about subimage data and voice data, the thing of the data of the image up Norikazu's angle type is used, for example. That is, the subimage data and voice data of an image of an angle type besides the above are not decoded, without being outputted from the above-mentioned demultiplexer 5.

[0121] Moreover, when a difference is in a bit rate by the coded-image data inputted into the coded-image data inputted into the 1st video decoder 22, and the 2nd video decoder 23, The capacity of the opening of the video buffer which is prepared between a demultiplexer 5, the free area of the video buffer which is prepared between the 1st video decoder 22, and which is not illustrated, a demultiplexer 5, and the 2nd video decoder 23 and which is not illustrated For example, what is necessary is to supervise by the controller 11 and just to send out data to a video buffer with an empty field from a demultiplexer 5. In addition, each video buffer is a buffer which absorbs the difference between the processing speed of distribution processing of a demultiplexer 5, and the processing speed of each video decoder decode. That is, if an opening is lost to the buffer of 1 using this buffer, data will be sent out to other buffers and the difference in a bit rate will be absorbed.

[0122] Moreover, it can also have the transfer switch 25 prepared between the video decoder 26 which has the processing speed twice the processing speed of usual in the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation as shown in drawing 9, and a demultiplexer 5 and the video decoder 26.

[0123] The above-mentioned transfer switch 25 outputs the coded-image data from a demultiplexer 5 to the video decoder 26 for example, per 1GOP. Switching of this transfer switch 25 is performed by the controller 11.

[0124] For example, when an instruction of a switch is issued during the output of the coded-image data corresponding to the image of the angle type of 1, a transfer switch 25 outputs the coded-image data corresponding to the image of other angle types. Therefore, either the coded-image data corresponding to the image of the angle type of 1 or the coded-image data corresponding to the image of other angle types is outputted by switch actuation of this transfer switch 25.

[0125] The above-mentioned video decoder 26 can perform decode processing for the coded-image data from a transfer switch 25 with twice [usual] as many processing speed as this. And the decode compressed data decoded and obtained by the video decoder 26 is displayed on a monitor 200 as an image through the subimage decoder 7, the subimage decoder 7, and the NTSC conversion circuit 9.

[0126] Therefore, it is also an image with the seamless DVD regenerative apparatus 1 to have the video decoder 26 with the above-mentioned transfer switch 25 and decode processing of being twice many as this, and it can switch the angle type of an image in an instant.

[0127] Next, the gestalt of the 3rd operation is explained. The gestalt of this 3rd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.

[0128] The DVD regenerative apparatus used as the gestalt of this 3rd operation is constituted so that the image of two or more angle types may be reproduced simultaneously. Therefore, this DVD regenerative apparatus has the mixing circuit 27 which mixes the decode image data outputted, respectively from the 1st video decoder 23 and the 2nd video decoder 24 into which the main image compressed data from a demultiplexer 5 is inputted, respectively, this 1st video decoder 22, and the 2nd video decoder 23, as shown in drawing 10.

[0129] That is, the DVD regenerative apparatus 1 used as the gestalt of the 3rd operation takes the configuration which replaces with the transfer switch 24 in the DVD regenerative apparatus 1 used as a gestalt of the 2nd operation, and is equipped with a mixing circuit 27.

[0130] Thus, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it now to a monitor 200.

[0131] For example, the decode image data which constitutes the image of the 1st angle type from the 1st video decoder 22 is outputted. When the decode image data which constitutes the image of the 1st angle type from the 2nd video decoder 23 is outputted, as it is shown in drawing 12 (a) thru/or drawing 12 (b), it is the image (it is shown in drawing 12 (a).) of the 1st angle type. The image of the 2nd angle type (it is shown in drawing 12 (b).) It displays simultaneously (it is shown in drawing 12 (c).) It can carry out.

[0132] In addition, if it is made for the image of the 1st angle type and the image of the 2nd angle type not to lap in the screen of a monitor 200 as shown in drawing 12 (c), the DVD regenerative apparatus 1 can share between the 1st video decoder 23 and the 2nd video decoder 24 the frame memory which consists of three storage regions for decode.

[0133] Moreover, when each of the 1st video decoder 22 and the 2nd video decoder 23 is equipped with a frame memory As shown in drawing 13 (a) thru/or drawing 13 (b), it is the image (it is shown in drawing 13 (a).) of the 1st angle type. The whole display screen of a monitor 200 is used, and it is the image (it is shown in drawing 13 (b).) of the 2nd angle type. It displays using some display screens of a monitor 200 (it is shown in drawing 13 (c).) It can also carry out.

[0134] Moreover, the DVD regenerative apparatus 1 can decode I picture, P picture, and B picture by using the frame memory which consists of three storage regions for decode, and the usual playback is attained.

[0135] Therefore, the DVD regenerative apparatus 1 can usually reproduce the image of an angle type which is simultaneously different two like the time of having two video decoders as mentioned above, and can display the image of an angle type which is different in the two ones concerned which were usually reproduced on a monitor 200.

[0136] Next, the gestalt of the 4th operation is explained. The gestalt of this 4th operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.

[0137] The DVD regenerative apparatus used as the gestalt of this 4th operation is constituted so that the image of two or more angle types can be reproduced simultaneously and the image of the angle type under playback can be switched seamlessly and momentarily. Therefore, the 1st video decoder 22 and the 2nd video decoder 23 into which the main image compressed data from a demultiplexer 5 is inputted, respectively as this DVD regenerative apparatus is shown in drawing 11, The mixing circuit 27 which mixes the decode image data outputted, respectively from this 1st video decoder 22 and the 2nd video decoder 23, The switch 28 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 1st video decoder 22, It has the switch 29 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 2nd video decoder 23.

[0138] Thus, where a switch 28 and a switch 29 are turned ON, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it to a monitor 200. For example, the mixed image can supply the DVD regenerative apparatus 1 to a monitor 200 so that it may be displayed on drawing 12 (c) and drawing 13 (c).

[0139] Furthermore, by actuation of ON/OFF of a switch 28 and a switch 29, the DVD regenerative apparatus 1 can switch the 1st video decoder 22 and the 2nd video decoder 23, and can also decode coded-image data. In this case, when a switch 28 is ON, a switch 29 is turned OFF, and a switch 29 is turned ON when a switch 28 is OFF.

[0140] For example, when an instruction of a switch is issued during the output of the decode image data which constitutes the image of the angle type of the 1st video decoder 22-1, the decode image data which constitutes the image of other angle types from the 2nd video decoder 23 can be outputted by turning OFF a switch 28 and turning ON a switch 29 by one side. That is, either of the image ***** decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 is switched in an instant, and is outputted.

[0141] Therefore, during playback of the image of the angle type of 1, it can switch in an instant, and can reproduce on the image of other angle types, and the DVD regenerative apparatus 1 can display the image of the angle type of the switched others concerned on a monitor 200.

[0142] Even if the DVD regenerative apparatus 1 which serve as a gestalt of the 4th operation from the above thing are reproducing two or more angle types simultaneously and a seamless image, they can also be switched to the image of other angle types in an instant.

[0143] With this DVD regenerative apparatus 1, the image of other angle types can be seen simultaneously and a viewer loses overlooking the image of an angle type to see when it switches to see other angle types by switch actuation further.

[0144] In addition, although playback of DVD with which the image of two angle types was recorded in the DVD regenerative apparatus 1 used as the gestalt of the 2nd thru/or the 4th operation was mentioned as the example and explained, three or more, for example, DVD with which the image of a two or more m angle type is recorded, are also reproducible. In this case, the DVD regenerative apparatus 1 constitutes each part so that it may become one m times the processing speed [m pieces and] of this about two pieces and twice as many processing speed as this, respectively.

[0145]

[Effect of the Invention] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, Cutback processing is performed to the decode image data memorized by the storage means for decode. By having the control means which reads the display image data containing the decode image data which wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.

[0146] therefore, the above-mentioned signal regeneration equipment — for example, — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.

[0147] moreover, the signal-regeneration equipment concerning this invention can decode two or more coded-image data, and can switch them in an instant, or can reproduce the image of two or more angle types simultaneously by having m storage means memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means decode the above-mentioned coded-image data outputted from m storage means, and generate decode image data.

[0148] And the above-mentioned signal regeneration equipment can be switched to the image of other angle types also, for example in playback of a seamless image in an instant.

[0149] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, Cutback processing is performed to the above-mentioned decode image data memorized at the decode image data storage process. By having the control process which reads the display image data containing the above-mentioned decode image data which wrote in the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.

[0150] therefore — according to the above-mentioned signal regeneration approach — for example — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.

[0151] Moreover, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem by having m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data Two or more coded-image data can be decoded, and it can switch in an instant, or the image of two or more angle types can be reproduced simultaneously.

[0152] And according to the above-mentioned signal regeneration approach, also, for example in playback of a seamless image, it can switch to the image of other angle types in an instant.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the signal regeneration equipment and the approach of reproducing two or more dynamic images which have the same attribute especially about the signal regeneration equipment and the approach of decoding the coded-image data which constitute a dynamic image, and reproducing a dynamic image.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Carrying out random access is mentioned as a description common to an optical disk. Taking advantage of this description, as for DVD (digital video disc: DVD-VIDEO) which is an optical disk, the multi-angle-type function, the multi-story function, etc. are incorporated.

[0003] The above-mentioned multi-angle-type function is a function which reproduces the image simultaneously photoed from the camera angle from which plurality differs, for example, is a function which makes refreshable the image of two or more angle types to the image of 1.

[0004] the angle type of the above-mentioned plurality [DVD] — selection — the data made refreshable are constituted as angle iron. Angle iron makes the image data of each angle type a fragment, is formed, in DVD, the so-called interleave structure is used for it, mixes each angle iron, and is recording it on the signal recording surface. DVD is adopting the record structure of such data, and is realizing the above-mentioned multi-angle-type function and the multi-story function.

[0005] A DVD regenerative apparatus can reproduce the above DVDs, for example, and can switch and reproduce them on real time on the image of an angle type to see during playback.

[0006] in addition, seamlessness and the angle iron (henceforth SML_AG_BLK) which it is alike and can be connected about other angle types, and the other angle iron — that is, — non — there is angle iron (henceforth NSML_AGL_BLK) to which that it is only seamless can switch an angle type. [be / when the image of those with two kind and synchronization is switched to the above-mentioned angle iron / namely, / no break]

[Translation done.]

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EFFECT OF THE INVENTION

[Effect of the Invention] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, Cutback processing is performed to the decode image data memorized by the storage means for decode. By having the control means which reads the display image data containing the decode image data which wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.

[0146] therefore, the above-mentioned signal regeneration equipment — for example, — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.

[0147] moreover, the signal-regeneration equipment concerning this invention can decode two or more coded-image data, and can switch them in an instant, or can reproduce the image of two or more angle types simultaneously by having m storage means memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means decode the above-mentioned coded-image data outputted from m storage means, and generate decode image data.

[0148] And the above-mentioned signal regeneration equipment can be switched to the image of other angle types also, for example in playback of a seamless image in an instant.

[0149] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, Cutback processing is performed to the above-mentioned decode image data memorized at the decode image data storage process. By having the control process which reads the display image data containing the above-mentioned decode image data which wrote in the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region The image of two or more angle types constituted with coded-image data is simultaneously reproducible.

[0150] therefore — according to the above-mentioned signal regeneration approach — for example — non — it cannot be concerned with whether to be seamless or not but an image can be offered simultaneously, and a viewer becomes, without overlooking an image seeing.

[0151] Moreover, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem by having m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data Two or more coded-image data can be decoded, and it can switch in an instant, or the image of two or more angle types can be reproduced simultaneously.

[0152] And according to the above-mentioned signal regeneration approach, also, for example in playback of a seamless image, it can switch to the image of other angle types in an instant.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, when above-mentioned SML_AG_BLK is reproduced, the above-mentioned DVD regenerative apparatus will take [after switching an angle type] the time amount of a divisor second to change, although an angle type can be switched seamlessly. That is, as for the above-mentioned DVD regenerative apparatus, playback of another angle type of a flash cannot do an angle type the method of a switch, and the bottom. therefore — when a viewer wants to see the image of other angle types, even if it switches — the switched flash — being concerned — others — the image of an angle type will not be able to be seen but an image to see will be overlooked.

[0008] Furthermore, in playback of above-mentioned SML_AG_BLK, the angle type is restricted to the switch at once at the divisor second. And in all angle types, the subimage data which consist of audio data, title information, etc. are encoded only within the thing concerning the image of the angle type reproduced.

[0009] Moreover, when above-mentioned NSML_AG_BLK is reproduced, once the above-mentioned DVD regenerative apparatus sometimes stops playback the method of a switch, and the bottom, it must change an angle type to another angle type, and must resume playback. Thus, the image with which each angle type is not connected smoothly is not seen for a viewer, but serves as that of *****.

[0010] In addition, in playback of above-mentioned NSML_AG_BLK, another angle type of a flash is [an angle type] reproducible the method of a switch, and the bottom. Many [moreover, / more generally / the location which can switch an angle type / than above-mentioned SML_AG_BLK] furthermore — even if it switches to the image of other angle types — being concerned — others — audio data different from an image and subimage data of an angle type can be decoded.

[0011] When playback of above-mentioned NSML_AG_BLK and NSML_AG_BLK is performed, even if a DVD regenerative apparatus is able to switch an angle type, it cannot switch an angle type to sault MURESU and an instant.

[0012] Moreover, if a viewer can be simultaneously provided with the graphic display of each angle type for example, each angle-type image can always be checked and overlooking of the image by switch of each angle type and the difficulty of seeing can be canceled as mentioned above. Therefore, offer of the equipment which makes it possible to display the image of two or more angle types simultaneously is also desired.

[0013] then — even if it switches the image of two or more angle types which this invention is made in view of the above-mentioned actual condition, and are recorded on the record medium simultaneous — an instant — a sault — it aims at offering the signal regeneration equipment and the approach of seeing a MURESU image.

[Translation done.]

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MEANS

[Means for Solving the Problem] the signal regeneration equipment concerning this invention with a decode means to decode the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance and which carried out reading appearance with the means, and to generate the decode image data of two or more angle types, in order to solve an above-mentioned technical problem A storage means for decode to memorize the decode image data of the angle type of one of the two or more angle types generated with the decode means, A storage means for a display by which memorize display-image data and the storage region for indicating by division is formed, It has the control means which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized by the storage means for decode, wrote this decode image data that carried out cutback processing in the storage region of the storage means for a display, and was written in this storage region. By having these, signal regeneration equipment memorizes two or more decode image data to each storage region of the storage means for a display.

[0015] moreover, the signal regeneration equipment concerning this invention is equipped with m storage means to memorize the coded-image data which carried out reading appearance and which carried out reading appearance with the means, and a decode means to decode the above-mentioned coded-image data outputted from m storage means, and to generate decode image data in order to solve an above-mentioned technical problem. By having these, signal regeneration equipment is switched simultaneous and decodes the coded-image data of two or more angle types.

[0016] Furthermore, in order that the signal regeneration approach concerning this invention may solve an above-mentioned technical problem with the decode process which decodes the coded-image data of the angle type of one of the two or more angle types which carried out reading appearance, and which carried out reading appearance at the process, and generates the decode image data of two or more angle types The decode image data storage process of memorizing the decode image data of the angle type of one of the two or more angle types generated according to the decode process, The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data, It has the control process which reads the display image data containing the decode image data which performed cutback processing to the decode image data memorized at the decode image data storage process, wrote in the storage region where the storage process for a display has this decode image data that carried out cutback processing, and was written in this storage region.

[0017] moreover, the signal regeneration approach concerning this invention has m steps of storage processes of memorizing the coded-image data which carried out reading appearance and which carried out reading appearance at the process, and the decode process which decodes the coded-image data outputted from m steps of storage processes, and generates decode image data, in order to solve an above-mentioned technical problem.

[0018]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained, referring to a drawing.

[0019] The gestalt of the 1st operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD (digital video disc: DVD-VIDEO) might be reproduced first.

[0020] in addition, I picture and the inter-frame forward direction predicting-coding image which consist of a coded image in a frame as data which DVD is a record medium with which the image compression coding was carried out [the image] by MPEG 2 (Moving Picture Coding Experts Group 2) is recorded, and constitute image data — P picture [from] and B picture which consists of a bidirectional predicting-coding image are recorded.

[0021] Without performing predicting coding, the above-mentioned I picture carries out compression coding, can make one image, is **** coded-image data and generates an image by decode of only data itself. The above-mentioned P picture is coded-image data made from the image in the frame in front of one by carrying out predicting coding. The above-mentioned B picture is coded-image data made from the image in the frame of order by carrying out predicting coding.

[0022] That is, in case it decodes, I picture does not need other coded-image data, and P picture or B picture needs one or two coded-image data for others. Decode of these coded-images data is performed by the data decoder on the frame memory of a DVD regenerative apparatus.

[0023] The DVD regenerative apparatus which reproduces Above DVD divides and constitutes the frame memory 14 used in case it decodes, as shown in drawing 1 to three fields. A frame memory 14 has 1st storage region 14for decode b and 2nd storage region 14c for decode which remember I picture after decode, and P picture, i.e., decode image data, to be storage region 14a for a display which corresponds to the display of nine different images, for example, image [of the angle type of nine directions] **, and forms nine storage regions, and is constituted.

[0024] I picture or P picture is memorized as mentioned above by storage region 14for decode a of the above 1st, and 2nd storage region 14for decode b. For example, when decoding P picture, it decodes using the decode image data of I picture after the decode which memorizes the P picture concerned to either 1st storage region 14for decode b, or 2nd storage region 14c for decode, and is memorized in the decode storage region of another side, or P picture.

[0025] And the decode image data which consists of I picture or P picture decoded in 1st storage region 14 for decode a or the 2nd storage region for decode is memorized to the field to which cutback processing was performed and it was divided in the above-mentioned storage region 14a for a display.

[0026] The above-mentioned storage region 14a for a display is a field which memorizes display image data. It divides into nine fields 14a1, 14a2, 14a3, 14a4, 14a5, 14a6, 14a7, 14a8, and 14a9 corresponding to displaying the image of nine ANGU, and it is constituted so that the above-mentioned decode image data by which the above-mentioned cutback processing was performed to each of this field may be memorized.

[0027] In addition, the image data in storage region 14a for a display is reproduced by the monitor by playback of display-image data. Moreover, the mode of the storage region of storage region 14a for a display can be chosen as arbitration. In this case, the above-mentioned decode image data memorized in the storage region formed in the selected mode is reproduced as an image with the above-mentioned display screen data by the part corresponding to the above-mentioned storage region of display screens, such as a monitor.

[0028] For example, in playback by multi-angle-type functional activation, each decode image data which constitutes the image of the angle type of this time of day to each above-mentioned field is memorized, respectively. For example, the decode image data concerning the image of the 1st angle type thru/or the 9th angle type is assigned and memorized to nine fields.

[0029] Thus, by having the constituted frame memory 14, for example, a DVD regenerative apparatus can display the image which decoded the coded-image data which constitute the image of two or more angle types memorized by DVD, these-decoded at once, and was acquired on each display of a monitor.

[0030] Hereafter, the above-mentioned frame memory 14 is explained in more detail using the DVD regenerative apparatus 1 constituted as shown in drawing 2.

[0031] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium (DVD) 100 as shown in drawing 2, The RF circuit 3 which the RF signal reproduced by this pickup 2 is supplied, and performs binary-ized processing of this RF signal etc., It has the data decoder 4 which the playback data from the RF circuit 3 are supplied, and carries out decoding, such as an error correction, and the demultiplexer 5 which distributes the playback data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.

[0032] In addition, the above-mentioned main image compressed data is constituted by coded-image data, such as the above-mentioned I picture, P picture, and B picture.

[0033] Moreover, the video decoder 6 which decodes the above-mentioned main image compressed data which the DVD regenerative apparatus 1 was equipped with the above-mentioned frame memory 14, and was outputted from the demultiplexer 5, The subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the above-mentioned main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.

[0034] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.

[0035] Moreover, the NTSC signal or PAL signal from the NTSC conversion circuit 9 outputted from the DVD regenerative apparatus 1 is inputted into a monitor 200, and is converted into a video signal.

[0036] In addition, as shown in drawing 14, it is recorded by Video Object Set (henceforth VOBS), the record medium 100 which this DVD regenerative apparatus 1 reproduces being used as the unit of one work of a film etc.

[0037] Above VOBS consists of two or more Video Object (henceforth VOB). DVD is constituted so that it may become story expansion different the whole above VOB corresponding to the multi-strike-Li function in which he can see one film by two or more story expansions. And VOB is constituted by two or more Cell(s).

[0038] Above Cell serves as units, such as one scene in a film. That is, the combination for every scene of this serves as VOB, and constitutes the above-mentioned multi-strike-Li function etc. by the difference in this combination. And Cell is constituted by two or more Video Object Unit (henceforth VOBu).

[0039] Above VOBu consists of groups of two or more main image compressed data, subimage compressed data, and speech compression data. the main image compressed data, subimage compressed data, or speech compression data is mentioned later — as — the main imagery pack (V_PCK) from a demultiplexer 5, a subimagery pack (SP_PCK), or a voice pack (A_PCK) —
***** — it is-izing and outputted.

[0040] The above-mentioned main image compressed data is data used as the main image of a film, and constitutes the video stream in a DVD format. Moreover, subimage compressed data is data, such as a title, and constitutes the subpicture stream in a DVD format. And speech compression data are data about voice, and constitute the audio stream in a DVD format.

[0041] Here, in DVD, the image data of each angle type are made into the angle iron which it comes to make into a fragment, and interleave structure is used for GOP (Group of Picture) as used in the field of an MPEG 2 method, it mixes angle iron, and is recorded on DVD. For example, in 1VOBU, interleave structure is used for GOP and it is recorded. And as shown in drawing 15, 1GOP is constituted by I picture, P picture, and B picture, and it is usually constituted so that these I picture, P picture, and B picture may become 15 sheets in total.

[0042] Reading appearance of the data is carried out by the pickup 2 whose DVD regenerative apparatus 1 is equipped with the record medium (DVD) 100 with which data were recorded by the above-mentioned format.

[0043] Pickup 2 irradiates the laser beam from the laser light source included in the pickup 2 concerned at the signal recording

surface of a record medium 100, and receives the reflected light reflected by the signal recording surface. Pickup 2 supplies the RF signal reproduced according to the light which received light to the RF circuit 3.

[0044] The RF circuit 3 carries out waveform equalization of this RF signal, binary-ization, etc., and generates playback data, its synchronizing signal, etc. The digital data generated by this RF circuit 3 is supplied to a data decoder 4.

[0045] A data decoder 4 processes a recovery, an error correction, etc. of data based on the playback data generated by the RF circuit 3. The digital data with which the recovery etc. was carried out by the data decoder 4 is supplied to a demultiplexer 5.

[0046] Here, the main image compressed data is contained in the digital data. Therefore, it means that reading appearance of the coded-image data had been carried out by pickup 2, the RF circuit 3, and the data decoder 4 from the record medium 100.

[0047] A demultiplexer 5 divides into various packs, i.e., the main imagery pack, a subimagery pack, or a voice pack the digital data reproduced from the record medium 100 with which decoding of an error correction etc. was performed by the data decoder 4, and outputs each pack concerned to each latter decoder.

[0048] In addition, in order to absorb the processing speed of a demultiplexer 5 and the above-mentioned data decoder 4, the track buffer is prepared between the demultiplexer 5 and the data decoder 4.

[0049] A demultiplexer 5 supplies the main imagery pack which consists of main image compressed data to the video decoder 6, supplies the subimagery pack which consists of a subimage compression pack to the subimage decoder 7, and supplies the voice pack which consists of a speech compression pack to the audio decoder 8.

[0050] The video decoder 6 performs decode processing of the main image compressed data in the supplied main imagery pack, and generates the main image data expanding-ized by this decode processing. Here, the main image data are decode image data made into decoded I picture, P picture, and B picture. And the video decoder 6 has the above-mentioned frame memory 14, in order to perform decode processing.

[0051] Here, the 9th I picture or I picture, and P picture of an image of a multi-angle type in VOBUs are decoded, for example, and the case which performs forward direction playback where it is constituted possible [activation of for example, a multi-angle-type function] by the decode processing which the above-mentioned video decoder 6 performs using the above-mentioned frame memory 14 is explained. In addition, the case where the sequential decode of the I picture I2 in the 1st VOBUs and 2nd VOBUs is carried out about decode of the above-mentioned I picture is explained. Moreover, the case where the sequential decode of the I picture I2 in 1st VOBUs, the P picture P5, and the P picture P8 is carried out about decode processing of the above-mentioned I picture and P picture is explained.

[0052] When decoding only I picture, as shown in drawing 3 (a), the video decoder 6 decodes the I picture I2 of the inside which constitutes the inputted main image compressed data, and memorizes it to 1st storage region 14b for decode of a frame memory 14. The video decoder 6 performs decode of the I picture I2, rewriting on 1st storage region 14b for decode.

[0053] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 3 (b).

[0054] The memorized I picture I2 by which cutback processing was carried out at the above-mentioned storage region 14a for a display is projected on the display by which the monitor 200 was divided through the above-mentioned subimage decoder 7 and the NTSC conversion circuit 9 as an image.

[0055] While the DVD regenerative apparatus 1 projects the generated image by the decoded I picture I2, as shown in drawing 3 (c), it memorizes the I picture I2 currently recorded on 1st storage region 14b for decode of a frame memory 14 in the following I picture and VOBUs of ***** 2nd. Here, with having carried out by the I picture I2 of the 1st VOBUs, similarly, the video decoder 6 decodes the I picture I2 of this 2nd VOBUs, performs cutback processing after that, and copies it to storage region 14a for a display.

[0056] It projects in a monitor 200, the I picture I2 of the 2nd VOBUs which cutback processing was carried out and was copied to the above-mentioned storage region 14a for a display being used as the next image of the I picture I2 of the 1st above VOBUs. The decode image data (the main image data) decoded and obtained in the video decoder 6 in detail as mentioned above is supplied to the subimage decoder 7.

[0057] The subimage decoder 7 performs decode processing of the subimage compressed data in the supplied subimagery pack, compounds it to the above-mentioned main image data to which the subimage data which carried out this decode processing were supplied from the video decoder 6, and generates image data. That is, the subimage decoder 7 compounds the title data reproduced as subimage data with the above-mentioned main image data. In addition, this subimage decoder 7 outputs the main image data as image data as it is, when there are no subimage data. The subimage decoder 7 supplies the generated image data to the NTSC conversion circuit 9.

[0058] The NTSC conversion circuit 9 changes image data into television signals, such as NTSC and PAL, from digital data. The television signal from the NTSC conversion circuit 9 is projected on a monitor 200 as an image.

[0059] The I picture I2 decoded by the above-mentioned video decoder 6 is contained in the television signal inputted into the monitor 200. Moreover, corresponding to two or more storage regions where storage region 14a for a display of the above-mentioned frame memory 14 was divided, as for a monitor 200, a division indication of the display screen is given nine. Here, a division display follows the division mode of for example, the storage region for a display. Therefore, the image based on the above-mentioned I picture I2 projects on the display of 1 which comes to divide the display screen of a monitor 200.

[0060] In addition, the audio decoder 8 generates the voice data which performed decode processing of the speech compression data in a voice pack, and was elongated. That is, if voice data is compressed by the MPEG 2 method, the audio decoder 8 will carry out expanding processing corresponding to this, and will generate speech compression data. Moreover, besides a format of MPEG 2, if the audio decoder 8 is a format of Linear PCM or DORUBI AC 3, it will perform processing corresponding to this. The audio decoder 8 supplies the generated voice data to the A/D-conversion circuit 10.

[0061] The A/D-conversion circuit 10 changes and outputs the voice data which is digital data to the voice data of an analog. By supplying this output to a loudspeaker etc., a user can view and listen to the image reproduced from the record medium 100.

[0062] A controller 11 performs control of pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the video decoder 6, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10. Moreover, to this controller 11, an actuation input is carried out through the user interface 12 which are a control panel and a remote controller, and each circuit is controlled for it based on this actuation input.

[0063] This controller 11 performs write-in control by the frame memory 14, and read-out control through the video decoder 6. Namely, a controller 11 controls by writing in the storage region of 1 formed for the division display of cutback processing of the decode image data memorized in the storage region for decode of a frame memory 14, and the decode image data concerned of 1 which carried out cutback processing of storage region 14a for a display. And a controller 11 performs read-out control which the decode image data memorized in storage region 14a for a display reads.

[0064] In addition, read-out from display storage region 14a of decode image data is performed by read-out of the display image data of a display storage region 14a unit. The image by the decode image data memorized by up Norikazu's storage image with display-image data corresponding to [200] the above-mentioned storage region projects on the display position corresponding to the storage region concerned of a monitor.

[0065] Therefore, the DVD regenerative apparatus 1 can project simultaneously the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on a monitor 200 by performing similarly the decode and cutback processing which were performed to I picture of the 9th above-mentioned angle type to the 1st thru/or I picture of the 8th angle type. As shown in drawing 5 R> 5 (a) thru/or drawing 5 (d), a procedure which generates the image (200a) of the 1st angle type, the image (200b) of the 2nd angle type,, the image (200i) of the 9th angle type, and the image (200a) of the 1st angle type performs decode of the coded-image data which constitute the image of each angle type in this case.

[0066] In addition, if I picture is only decoded, the frame memory 14 should just be equipped with at least one storage region for decode as mentioned above.

[0067] Moreover, about the case of decode of I picture and P picture, as shown in drawing 4 (a), the inputted I picture I2 decodes the video decoder 6 first, and it is memorized by 1st storage region 14b for decode of a frame memory 14.

[0068] After decode, the video decoder 6 copies the I picture I2 after the decode which performed cutback processing to the decoded I picture I2, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display, as shown in drawing 4 (b).

[0069] The image generated by the I picture I2 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected on the display of 1 of the monitor 200 corresponding to storage region 14a for a display of a frame memory 14.

[0070] On the other hand, as shown in drawing 4 (c), the video decoder 6 predicts and decodes the P picture P5 inputted into the degree by the I picture I2 after the decode memorized by 1st storage region 14b for decode, and memorizes it to 2nd storage region 14c for decode.

[0071] After memorizing the P picture P5 after decode to 2nd storage region 14c for decode, the video decoder 6 copies the P picture P5 after the decode which performed cutback processing to the decoded P picture P5, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (d).

[0072] The image generated by the P picture P5 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned I picture I2 projected on the display of up Norikazu of a monitor 200.

[0073] In case the P picture P8 is decoded, as shown in drawing 4 (e), the video decoder 6 predicts and decodes the P picture P8 inputted into the degree by the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and memorizes it to 1st storage region 14b for decode.

[0074] After memorizing the P picture P8 after decode to 1st storage region 14b for decode, the video decoder 6 copies the P picture P8 after the decode which performed cutback processing to the decoded P picture P8, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display, as shown in drawing 4 R> 4 (f).

[0075] The image generated by the P picture P8 which cutback processing was carried out and was memorized by the above-mentioned storage region 14a for a display is projected as a next image of the above-mentioned P picture P5 projected on the display of up Norikazu of a monitor 200.

[0076] Therefore, it means that the image based on I picture and P picture which were decoded had projected on the display of up Norikazu of a monitor 200 one after another.

[0077] The DVD regenerative apparatus 1 can project the image of the 1st thru/or the 8th angle type in the 9th image and this time of day of an angle type on each display to which the monitor 200 corresponded by performing similarly the above-mentioned decode and the cutback processing which were performed to the 9th I picture and P picture of an angle type to I picture and P picture of the 1st thru/or the 8th angle type.

[0078] The forward direction playback performed by decode of only above-mentioned I picture or I picture, and P picture is applied when performing for example, high-speed playback. Moreover, what is necessary is just to establish the storage region for decode in a frame memory 14 further, if the usual playback is performed.

[0079] Moreover, the DVD regenerative apparatus 1 can also perform hard flow playback, and can also project the image of the 1st thru/or the 9th angle type of this time of day on a monitor 200 as mentioned above. For example, hard flow playback using I picture is performed by decoding I picture in GOP as I picture in the n-1st VOB(s) is decoded, after decoding I picture in n-th VOB.

[0080] And the hard flow playback using I picture and P picture decodes I picture by 1st storage region 14b for decode first, and decodes P picture based on it in the 2nd storage region for decode. For example, the I picture I2 is decoded by 1st storage region 14c for decode. Decode processing is performed as the P picture P5 in the same VOB is decoded by 2nd storage region 14c for decode based on the decoded I picture I2. Hard flow playback is performed by giving an indication to a monitor 200 the order of decode at reverse, namely, reproducing in order of the P picture P5 and the I picture I2.

[0081] next, the DVD regenerative apparatus 1 — hard flow — the case where I picture and P picture which constitute the image of the 9th angle type are decoded about the frame memory 14 constituted refreshable is explained.

[0082] hard flow — as shown in drawing 6, the frame memory 14 constituted refreshable has 1st decode storage region 14b which remembers the decode image data after decode of I picture or P picture to be storage region 14a for a display which forms nine storage regions, 2nd decode storage region 14c, and 14d of 3rd storage region for decode, and is constituted.

[0083] That is, when applying to hard flow playback, 14d of 3rd storage region for decode is further established in a frame memory 14.

[0084] When carrying out hard flow playback, as shown in drawing 7 (a), the inputted I picture I2 is decoded and it memorizes to 1st storage region 14b for decode of a frame memory 14.

[0085] Then, the P picture P5 inputted into the degree is decoded by prediction using the I picture I2 after the decode memorized by 1st storage region 14b for decode, and the video decoder 6 memorizes it to 2nd storage region 14c for decode, as shown in drawing 7 (b).

[0086] Furthermore, after that, the P picture P8 inputted into the degree is decoded by prediction using the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and the video decoder 6 memorizes it to 14d of 3rd storage region for decode, as shown in drawing 7 (c).

[0087] And each decode copy of data to storage region 14a for a display is performed in order of having processed the above-mentioned decode and reverse. That is, as shown in drawing 7 (d), the P picture P8 after the decode which performed cutback processing to the P picture P8 after the decode memorized first at 14d of 3rd storage region for decode, and performed the cutback processing concerned to the field 14a9 for the display of the 9th angle type of storage region 14a for a display is copied.

[0088] Next, as shown in drawing 7 (e), the P picture P5 after the decode which performed cutback processing to the P picture P5 after the decode memorized by 2nd storage region 14c for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.

[0089] And as shown in drawing 7 (f), the I picture I2 after the decode which performed cutback processing to the I picture I2 after the decode memorized by 1st storage region 14b for decode, and performed the cutback processing concerned to the field 14a9 of storage region 14a for a display is copied.

[0090] As mentioned above, the DVD regenerative apparatus 1 can indicate the image of the P picture P8, the P picture P5, and the I picture I2 by sequential at the display of 1 of the monitor 200 corresponding to the above-mentioned field 14a9 by carrying out the sequential copy of the P picture P8, the P picture P5, and the I picture I2 to the field 14a9 of storage region 14a for a display.

[0091] In addition, the hard flow playback performed by decode of only above-mentioned I picture and P picture is applied when performing for example, high-speed reverse playback. Moreover, what is necessary is just to establish one storage region for decode in a frame memory 14, if the usual hard flow playback is performed.

[0092] As mentioned above, it is explanation in the case of performing hard flow playback using the frame memory 14 constituted so that decode of only I picture or I picture, and P picture might perform, and this frame memory 14.

[0093] The DVD regenerative apparatus 1 is having the frame memory 14 constituted as mentioned above, and it becomes possible in forward direction playback and hard flow playback to display simultaneously the image of two or more angle types which can be set at this time of day.

[0094] The problem of overlooking the image of other switched momentary angle types which were made into the problem in the seamless image switch thereby, for example is also solvable. For example, a viewer can also see simultaneously the image of other angle types [can see a seamless image and] to see.

[0095] in addition — not only an image with the seamless image of the angle type to reproduce — non, you may be a seamless image.

[0096] Moreover, the image of each angle type is constituted as for example, 1VOBU unit, and the image of each angle type of the image of this time of day has an attribute between each VOB further. That is, the DVD regenerative apparatus 1 has decoded the picture in each VOB by which matching was carried out [above-mentioned] in playback of the image of each angle type.

[0097] However, it is not limited to this, but it is for example, at the forward direction playback time, and the DVD regenerative apparatus 1 can also decode the picture which constitutes the image of an angle type besides the above of VOB belonging to the next time of day, when decoding the picture of the image of other angle types. Moreover, it is the DVD regenerative apparatus 1 at the hard flow playback time, and when decoding the picture of the image of other angle types, it can also decode the picture which constitutes the image of an angle type besides the above of VOB belonging to true time of day.

[0098] Next, the gestalt of the 2nd operation is explained. The gestalt of the 2nd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.

[0099] In addition, DVD consists of data formats which have a multi-angle-type function like the gestalt of the 1st operation of a ****. That is, the MPEG 2 method is used for DVD, and it carries out compression coding as I picture, P picture, and a B picture, and is recording the image. The case where DVD with which the image of two different angle types is recorded hereafter is reproduced is explained.

[0100] As shown in drawing 8, a DVD regenerative apparatus is equipped with two video decoders, switches the output of the decode image data decoded and obtained by this two video decoder, and is outputting it to the latter circuit.

[0101] The pickup 2 whose DVD regenerative apparatus 1 reproduces a RF signal from a record medium 100 in detail, The RF circuit 3 which the RF signal reproduced by this pickup 2 is carried out, and performs binary-ized processing for this RF signal, The data decoder 4 which the playback data from the RF circuit 3 etc. are supplied, and carries out decoding, such as an error correction, The track buffer 21 which memorizes the digital data which has the 1st storage region 21a and 2nd storage region

21b, and was outputted from the data decoder 4. It has the demultiplexer 5 which distributes the digital data with which decoding was carried out by the data decoder 4 to the main image compressed data, subimage compressed data, and speech compression data.

[0102] Moreover, the 1st video decoder 22 and the 2nd video decoder 23 which decode the above-mentioned main image compressed data with which the DVD regenerative apparatus 1 was outputted from the demultiplexer 5, the subimage decoder 7 which decodes the above-mentioned subimage compressed data, and is compounded with the main image data, Digital one/NTSC, the PAL conversion circuit (it is only hereafter called the NTSC conversion circuit.) which the image data with which the subimage data and the main image data from the audio decoder 8 which decodes the above-mentioned speech compression data, and the subimage decoder 7 were compounded are supplied, and are changed into an NTSC signal or a PAL signal. It has 9 and the digital to analog circuit (only henceforth an A/D-conversion circuit) 10 which the audio data from the audio decoder 8 are supplied, and is changed into an analog signal.

[0103] Furthermore, the DVD regenerative apparatus 1 is equipped with the controller 11 which controls pickup 2, the RF circuit 3, a data decoder 4, a demultiplexer 5, the 1st video decoder 22, the 2nd video decoder 23, a transfer switch 24, the subimage decoder 7, the audio decoder 8, the NTSC conversion circuit 9, and the A/D-conversion circuit 10, this controller 11 and the user interface 12 which carries a user's actuation input, and the memory 13 used as the data storage section of a controller 11.

[0104] The data decoder 4 which decodes the playback data by which signal processing was carried out in the pickup 2 which reproduces a RF signal from the above-mentioned record medium 100, the RF circuit 3 which carries out signal processing of this RF signal, and the RF circuit 3 is constituted so that each can usually make processing speed processing [twice]. Here, processing when processing reads a part for the image of one angle type from a record medium 100, for example is usually said.

[0105] Moreover, the above-mentioned demultiplexer 5 is also constituted so that processing speed of data can usually be made into processing [twice]. Thereby, a demultiplexer 5 can perform distribution of the main image compressed data inputted, subimage compressed data, and speech compression data, without differing from the above-mentioned usual processing.

[0106] Hereafter, the component of the above-mentioned DVD regenerative apparatus 1 is explained. In addition, about the part explained with the DVD regenerative apparatus 1 used as the gestalt of the 1st operation, the same number as drawing 2 is attached and the explanation is omitted.

[0107] The DVD regenerative apparatus 1 inputs into a track buffer 21 the coded-image data currently recorded on the record medium 100 through pickup 2, the RF circuit 3, and a data decoder 4.

[0108] The above-mentioned track buffer 21 has two storage regions, the 1st storage region 21a and 2nd storage region 21b. A track buffer 21 memorizes the digital data inputted into each above-mentioned storage region. Here, the digital data contains the main image compressed data divided by the demultiplexer 5, subimage compressed data, and speech compression data, as mentioned above.

[0109] This track buffer 21 is absorbing the difference in the processing speed of the above-mentioned data decoder 4 and a demultiplexer 5. And a track buffer 4 outputs digital data to the demultiplexer 5 concerned by the move instruction from a demultiplexer 5.

[0110] The demultiplexer 5 usually has one twice the processing speed of processing speed, as mentioned above. A demultiplexer 5 incorporates by turns the digital data outputted from each above-mentioned storage region of a track buffer 21, divides the incorporated digital data into the main image compressed data, subimage compressed data, and speech compression data, and outputs it to the 1st video decoder 22 or the 2nd video decoder 23, the subimage decoder 7, and the voice decoder 8.

[0111] The main image compressed data outputted to the 1st video decoder 22 and the 2nd video decoder 23 is the so-called coded-image data, and is data constituted by the so-called I picture, P picture, and B picture. And an output is performed to each above-mentioned video decoder 6 so that it may become for example, 1GOP unit. Moreover, the above-mentioned main image compressed data, subimage compressed data, and speech compression data are supplied to each decoder with which it was pack-ized and the latter part of a demultiplexer 5 was equipped.

[0112] In addition, it has the frame memory equipped with three storage regions for decode for decode of I picture, P picture, and B picture, respectively in the 1st video decoder 22 and the 2nd video decoder 23.

[0113] The 1st video decoder 22 and the 2nd video decoder 23 decode each inputted coded-image data. Inter-frame prediction performs decode processing performed here. The decode image data decoded by this 1st video decoder 22 and the 2nd video decoder 23 is inputted into a transfer switch 24.

[0114] A transfer switch 24 supplies either of the decode image data from the video decoder 22 of the above 1st, or the 2nd video decoder 23 to the latter subimage decoder 7. Switching of a transfer switch 24 is performed by the controller 11.

[0115] For example, the data to which a transfer switch 24 outputs an instruction of a switch during the output of the decode image data from the 1st video decoder 21 by switch actuation a carrier beam case are switched to decode image data from the 2nd video decoder 23. Therefore, the coded-image data decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 are switched by this transfer switch 24 in an instant so that either may be outputted. For example, such switching is performed in the case of a switch of the image of an angle type.

[0116] The decode image data outputted through the above-mentioned transfer switch 24 is displayed on a monitor 200 as an image through the subimage decoder 7 and the NTSC conversion circuit 9.

[0117] Therefore, since it can switch in an instant and can reproduce on the image of other angle types during playback of the image of the angle type of 1, the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation can display the image of other angle types of the switched flash concerned on a monitor 200.

[0118] with this DVD regenerative apparatus 1, a viewer wants to see, when it switches to the image of other angle types — being concerned — others — overlooking the image of an angle type is lost.

[0119] not only an image with the seamless image of an angle type here — non, you may be a seamless image, and regardless of the class of these images, the DVD regenerative apparatus 1 can be switched in an instant, and can be reproduced.

[0120] In addition, even if it switches to the image of an angle type besides the above, about subimage data and voice data, the

thing of the data of the image up Norikazu's angle type is used, for example. That is, the subimage data and voice data of an image of an angle type besides the above are not decoded, without being outputted from the above-mentioned demultiplexer 5. [0121] Moreover, when a difference is in a bit rate by the coded-image data inputted into the coded-image data inputted into the 1st video decoder 22, and the 2nd video decoder 23, The capacity of the opening of the video buffer which is prepared between a demultiplexer 5, the free area of the video buffer which is prepared between the 1st video decoder 22, and which is not illustrated, a demultiplexer 5, and the 2nd video decoder 23 and which is not illustrated For example, what is necessary is to supervise by the controller 11 and just to send out data to a video buffer with an empty field from a demultiplexer 5. In addition, each video buffer is a buffer which absorbs the difference between the processing speed of distribution processing of a demultiplexer 5, and the processing speed of each video decoder decode. That is, if an opening is lost to the buffer of 1 using this buffer, data will be sent out to other buffers and the difference in a bit rate will be absorbed.

[0122] Moreover, it can also have the transfer switch 25 prepared between the video decoder 26 which has the processing speed twice the processing speed of usual in the DVD regenerative apparatus 1 used as the gestalt of the 2nd operation as shown in drawing 9 , and a demultiplexer 5 and the video decoder 26.

[0123] The above-mentioned transfer switch 25 outputs the coded-image data from a demultiplexer 5 to the video decoder 26 for example, per 1GOP. Switching of this transfer switch 25 is performed by the controller 11.

[0124] For example, when an instruction of a switch is issued during the output of the coded-image data corresponding to the image of the angle type of 1, a transfer switch 25 outputs the coded-image data corresponding to the image of other angle types. Therefore, either the coded-image data corresponding to the image of the angle type of 1 or the coded-image data corresponding to the image of other angle types is outputted by switch actuation of this transfer switch 25.

[0125] The above-mentioned video decoder 26 can perform decode processing for the coded-image data from a transfer switch 25 with twice [usual] as many processing speed as this. And the decode compressed data decoded and obtained by the video decoder 26 is displayed on a monitor 200 as an image through the subimage decoder 7, the subimage decoder 7, and the NTSC conversion circuit 9.

[0126] Therefore, it is also an image with the seamless DVD regenerative apparatus 1 to have the video decoder 26 with the above-mentioned transfer switch 25 and decode processing of being twice many as this, and it can switch the angle type of an image in an instant.

[0127] Next, the gestalt of the 3rd operation is explained. The gestalt of this 3rd operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.

[0128] The DVD regenerative apparatus used as the gestalt of this 3rd operation is constituted so that the image of two or more angle types may be reproduced simultaneously. Therefore, this DVD regenerative apparatus has the mixing circuit 27 which mixes the decode image data outputted, respectively from the 1st video decoder 23 and the 2nd video decoder 24 into which the main image compressed data from a demultiplexer 5 is inputted, respectively, this 1st video decoder 22, and the 2nd video decoder 23, as shown in drawing 10 .

[0129] That is, the DVD regenerative apparatus 1 used as the gestalt of the 3rd operation takes the configuration which replaces with the transfer switch 24 in the DVD regenerative apparatus 1 used as a gestalt of the 2nd operation, and is equipped with a mixing circuit 27.

[0130] Thus, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it now to a monitor 200.

[0131] For example, the decode image data which constitutes the image of the 1st angle type from the 1st video decoder 22 is outputted. When the decode image data which constitutes the image of the 1st angle type from the 2nd video decoder 23 is outputted, as it is shown in drawing 12 (a) thru/or drawing 12 (b), it is the image (it is shown in drawing 12 (a).) of the 1st angle type. The image of the 2nd angle type (it is shown in drawing 12 (b).) It displays simultaneously (it is shown in drawing 12 (c).) It can carry out.

[0132] In addition, if it is made for the image of the 1st angle type and the image of the 2nd angle type not to lap in the screen of a monitor 200 as shown in drawing 12 (c), the DVD regenerative apparatus 1 can share between the 1st video decoder 23 and the 2nd video decoder 24 the frame memory which consists of three storage regions for decode.

[0133] Moreover, when each of the 1st video decoder 22 and the 2nd video decoder 23 is equipped with a frame memory As shown in drawing 13 (a) thru/or drawing 13 (b), it is the image (it is shown in drawing 13 (a).) of the 1st angle type. The whole display screen of a monitor 200 is used, and it is the image (it is shown in drawing 13 (b).) of the 2nd angle type. It displays using some display screens of a monitor 200 (it is shown in drawing 13 (c).) It can also carry out.

[0134] Moreover, the DVD regenerative apparatus 1 can decode I picture, P picture, and B picture by using the frame memory which consists of three storage regions for decode, and the usual playback is attained.

[0135] Therefore, the DVD regenerative apparatus 1 can usually reproduce the image of an angle type which is simultaneously different two like the time of having two video decoders as mentioned above, and can display the image of an angle type which is different in the two ones concerned which were usually reproduced on a monitor 200.

[0136] Next, the gestalt of the 4th operation is explained. The gestalt of this 4th operation is the DVD regenerative apparatus constituted so that the signal regeneration equipment and the approach concerning this invention might be applied and DVD might be reproduced.

[0137] The DVD regenerative apparatus used as the gestalt of this 4th operation is constituted so that the image of two or more angle types can be reproduced simultaneously and the image of the angle type under playback can be switched seamlessly and momentarily. Therefore, the 1st video decoder 22 and the 2nd video decoder 23 into which the main image compressed data from a demultiplexer 5 is inputted, respectively as this DVD regenerative apparatus is shown in drawing 11 , The mixing circuit 27 which mixes the decode image data outputted, respectively from this 1st video decoder 22 and the 2nd video decoder 23,

The switch 28 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 1st video decoder 22, It has the switch 29 which turns on and turns off sending out to a mixing circuit 27 about the decode image data outputted from the 2nd video decoder 23.

[0138] Thus, where a switch 28 and a switch 29 are turned ON, by the mixing circuit 27, the constituted DVD regenerative apparatus 1 can mix the decode image data outputted from the 1st video decoder 22, and the decode image data outputted from the 2nd video decoder 23, and can supply it to a monitor 200. For example, the mixed image can supply the DVD regenerative apparatus 1 to a monitor 200 so that it may be displayed on drawing 12 (c) and drawing 13 (c).

[0139] Furthermore, by actuation of ON/OFF of a switch 28 and a switch 29, the DVD regenerative apparatus 1 can switch the 1st video decoder 22 and the 2nd video decoder 23, and can also decode coded-image data. In this case, when a switch 28 is ON, a switch 29 is turned OFF, and a switch 29 is turned ON when a switch 28 is OFF.

[0140] For example, when an instruction of a switch is issued during the output of the decode image data which constitutes the image of the angle type of the 1st video decoder 22-1, the decode image data which constitutes the image of other angle types from the 2nd video decoder 23 can be outputted by turning OFF a switch 28 and turning ON a switch 29 by one side. That is, either of the image ***** decoded by the video decoder 22 of the above 1st and the 2nd video decoder 23 is switched in an instant, and is outputted.

[0141] Therefore, during playback of the image of the angle type of 1, it can switch in an instant, and can reproduce on the image of other angle types, and the DVD regenerative apparatus 1 can display the image of the angle type of the switched others concerned on a monitor 200.

[0142] Even if the DVD regenerative apparatus 1 which serve as a gestalt of the 4th operation from the above thing are reproducing two or more angle types simultaneously and a seamless image, they can also be switched to the image of other angle types in an instant.

[0143] With this DVD regenerative apparatus 1, the image of other angle types can be seen simultaneously and a viewer loses overlooking the image of an angle type to see when it switches to see other angle types by switch actuation further.

[0144] In addition, although playback of DVD with which the image of two angle types was recorded in the DVD regenerative apparatus 1 used as the gestalt of the 2nd thru/or the 4th operation was mentioned as the example and explained, three or more, for example, DVD with which the image of a two or more m angle type is recorded, are also reproducible. In this case, the DVD regenerative apparatus 1 constitutes each part so that it may become one m times the processing speed [m pieces and] of this about two pieces and twice as many processing speed as this, respectively.

[0145]

[Translation done.]

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- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the frame memory with which the DVD regenerative apparatus used as the gestalt of operation of the 1st of this invention is equipped.

[Drawing 2] It is the circuit diagram showing the above-mentioned DVD regenerative apparatus.

[Drawing 3] In the above-mentioned frame memory, when decoding coded-image data, it is the block diagram showing signs that especially I picture is decoded.

[Drawing 4] In the above-mentioned frame memory, when decoding coded-image data, it is the block diagram showing signs that I picture and P picture are decoded especially.

[Drawing 5] It is the top view showing the monitor used for explanation of the procedure which decodes coded-image data.

[Drawing 6] It is the block diagram showing the above-mentioned frame memory constituted in reverse playback.

[Drawing 7] In the frame memory constituted in the above-mentioned reverse playback, when decoding coded-image data, it is the block diagram showing signs that I picture and B picture are decoded especially.

[Drawing 8] It is the circuit diagram showing the DVD regenerative apparatus used as the gestalt of operation of the 2nd of this invention.

[Drawing 9] It is the circuit diagram showing the case where the important section of the DVD regenerative apparatus used as the gestalt of implementation of the above 2nd is changed.

[Drawing 10] It is the circuit diagram showing the important section configuration of the DVD regenerative apparatus used as the gestalt of operation of the 3rd of this invention.

[Drawing 11] It is the circuit diagram showing the important section configuration of the DVD regenerative apparatus used as the gestalt of operation of the 4th of this invention.

[Drawing 12] It is the top view showing the monitor with which the image of two or more angle types is displayed.

[Drawing 13] The image of two or more angle types is the top view showing the monitor currently displayed by the method of other displays.

[Drawing 14] It is the data format which shows DVD reproduced with the DVD regenerative apparatus used as the gestalt of the above 1st thru/or the 4th implementation.

[Drawing 15] It is the data format which shows GOP currently recorded on Above DVD.

[Description of Notations]

1 Signal Regeneration Equipment, 2 Pickup, 3 RF Circuit, 4 Data Decoder, 5 A demultiplexer, 14 A frame memory, 14a The storage region for a display, 14b The 1st storage region for decode, 14c The 2nd storage region for decode, 14d The 3rd storage region for decode, 21 A track buffer, 22 The 1st video decoder, 23 — the 2nd video decoder and 24 A transfer switch and 25 A transfer switch and 26 A video decoder and 27 A mixing circuit and 28 A switch and 29 Switch

[Translation done.]

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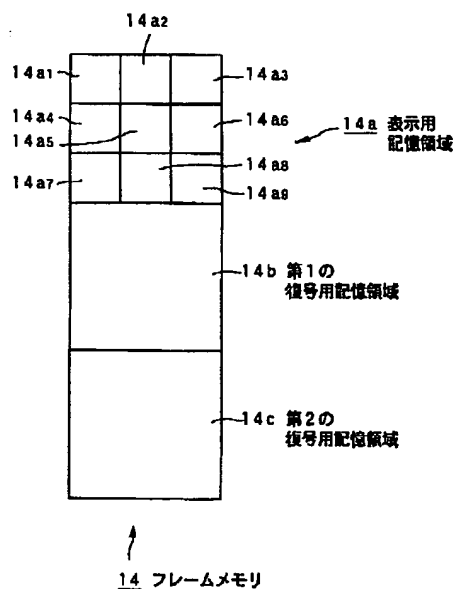
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2.*** shows the word which can not be translated.

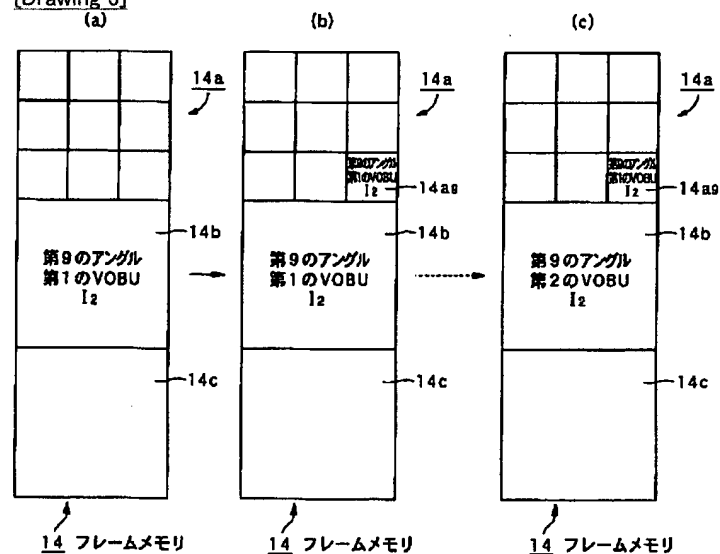
3.In the drawings, any words are not translated.

DRAWINGS

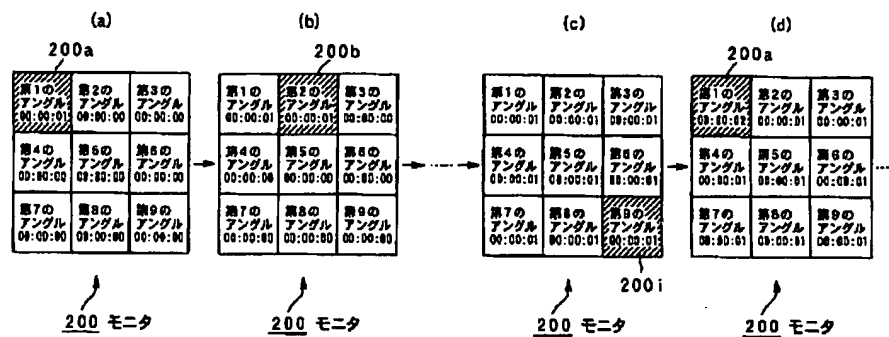
[Drawing 1]



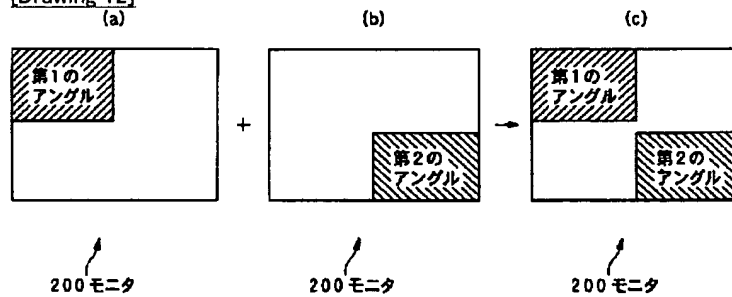
[Drawing 3]



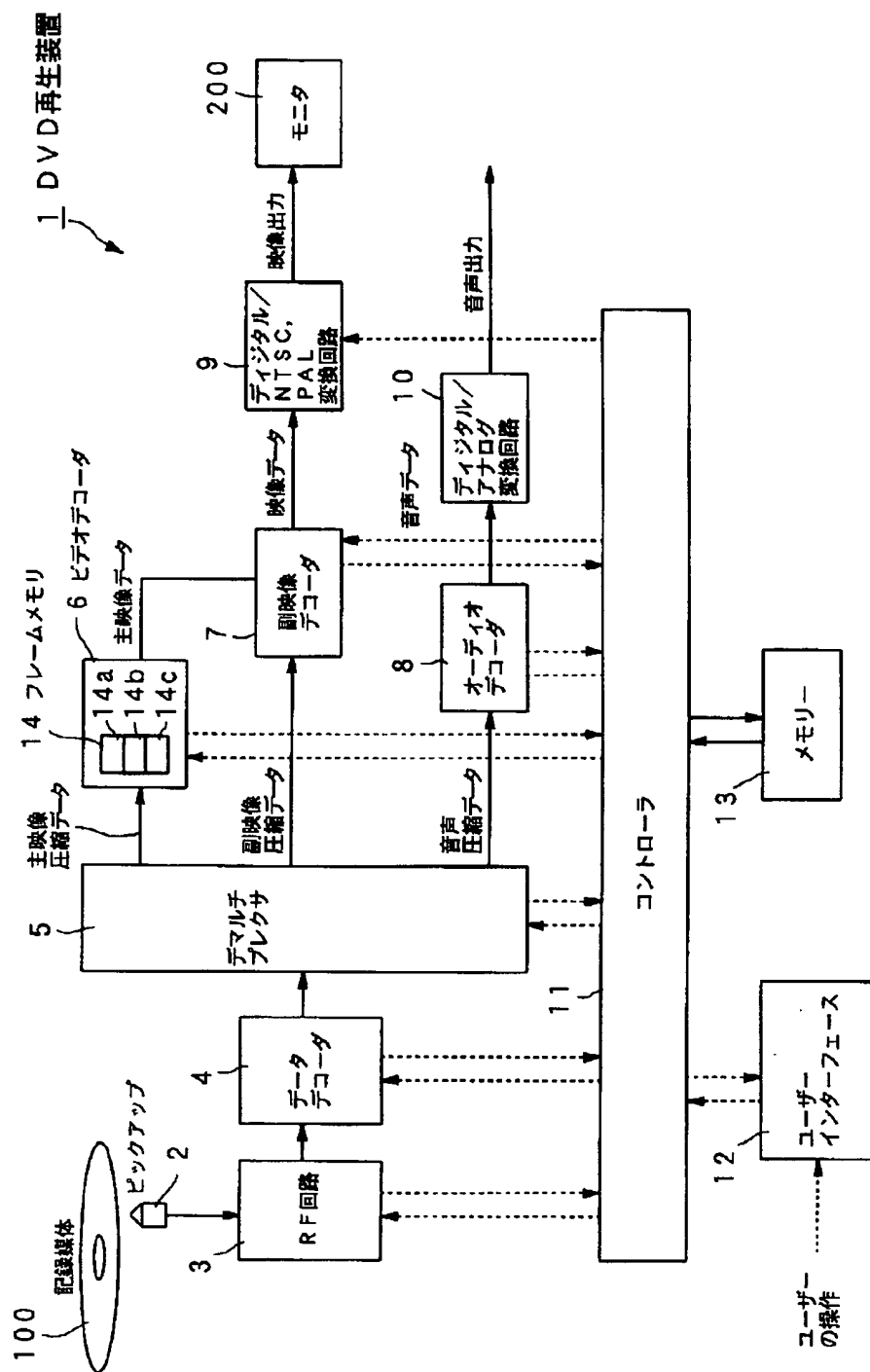
[Drawing 5]



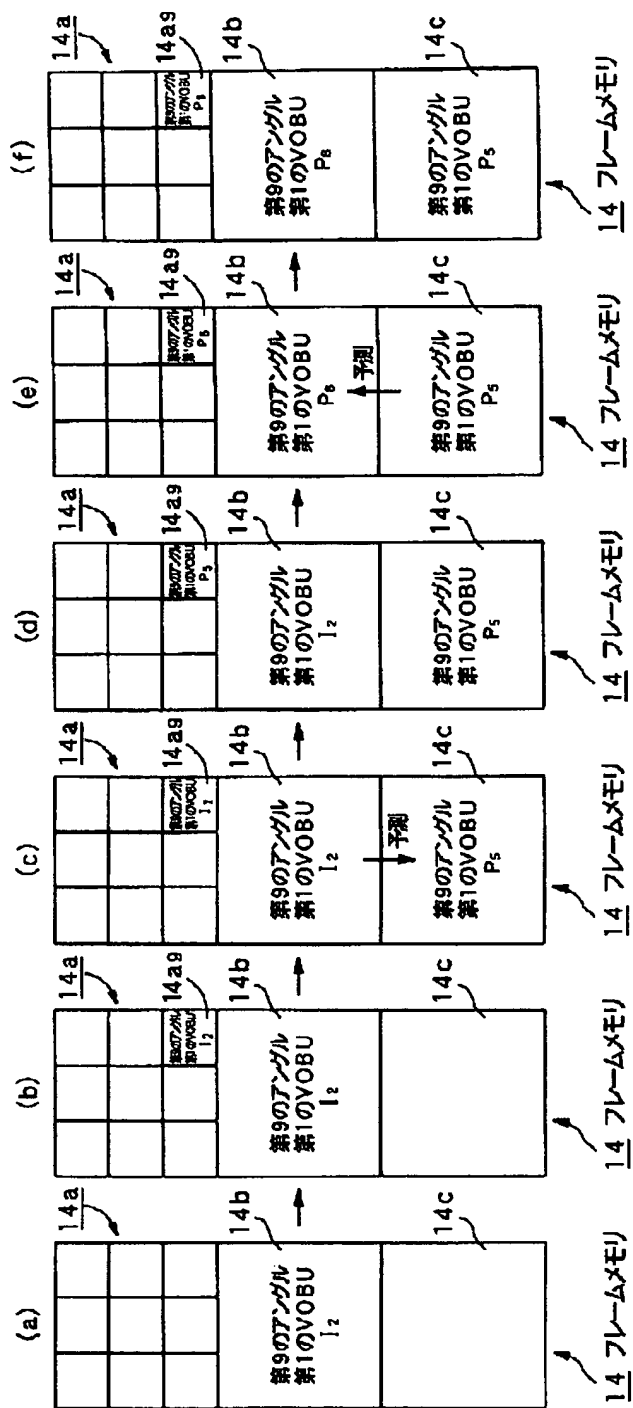
[Drawing 12]



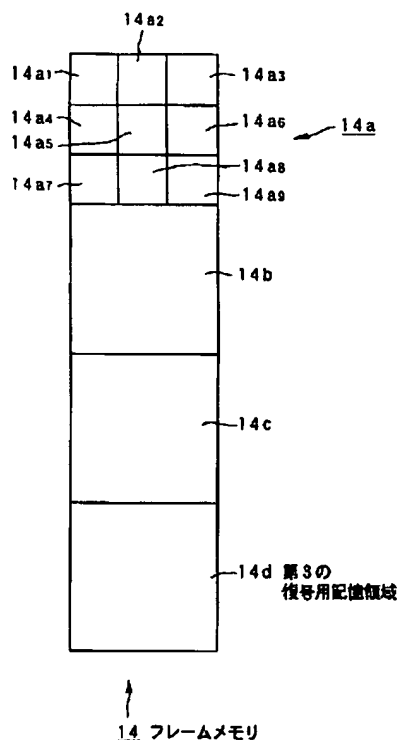
[Drawing 2]



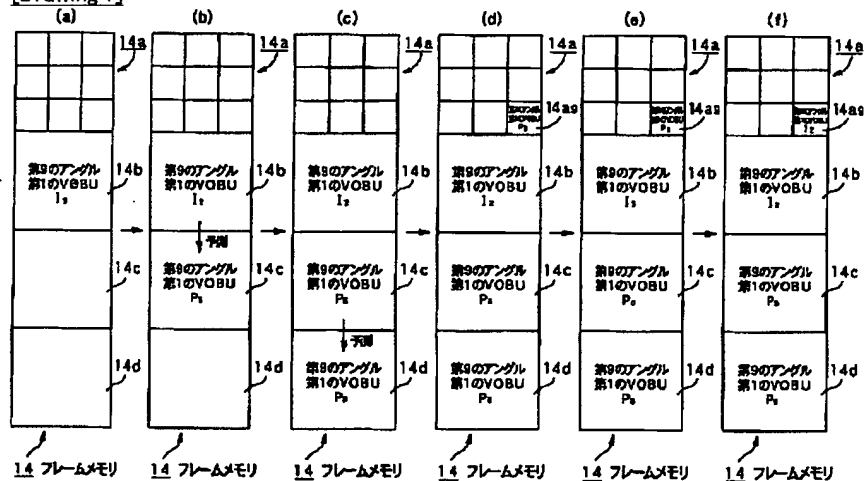
[Drawing 4]



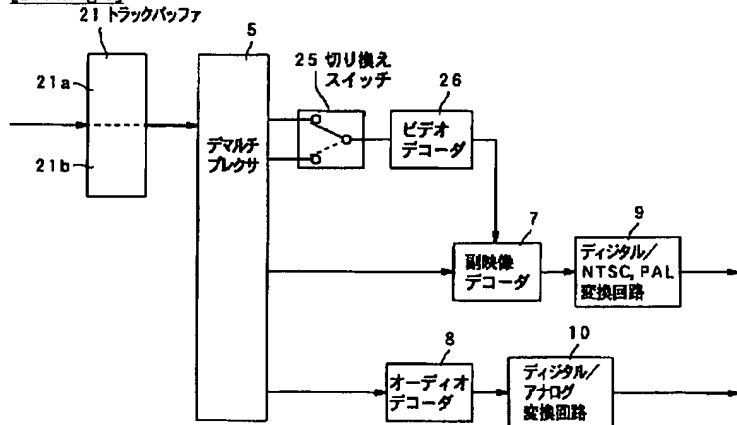
[Drawing 6]



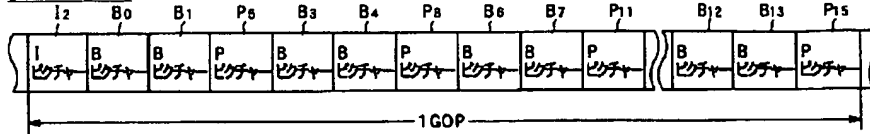
[Drawing 7]



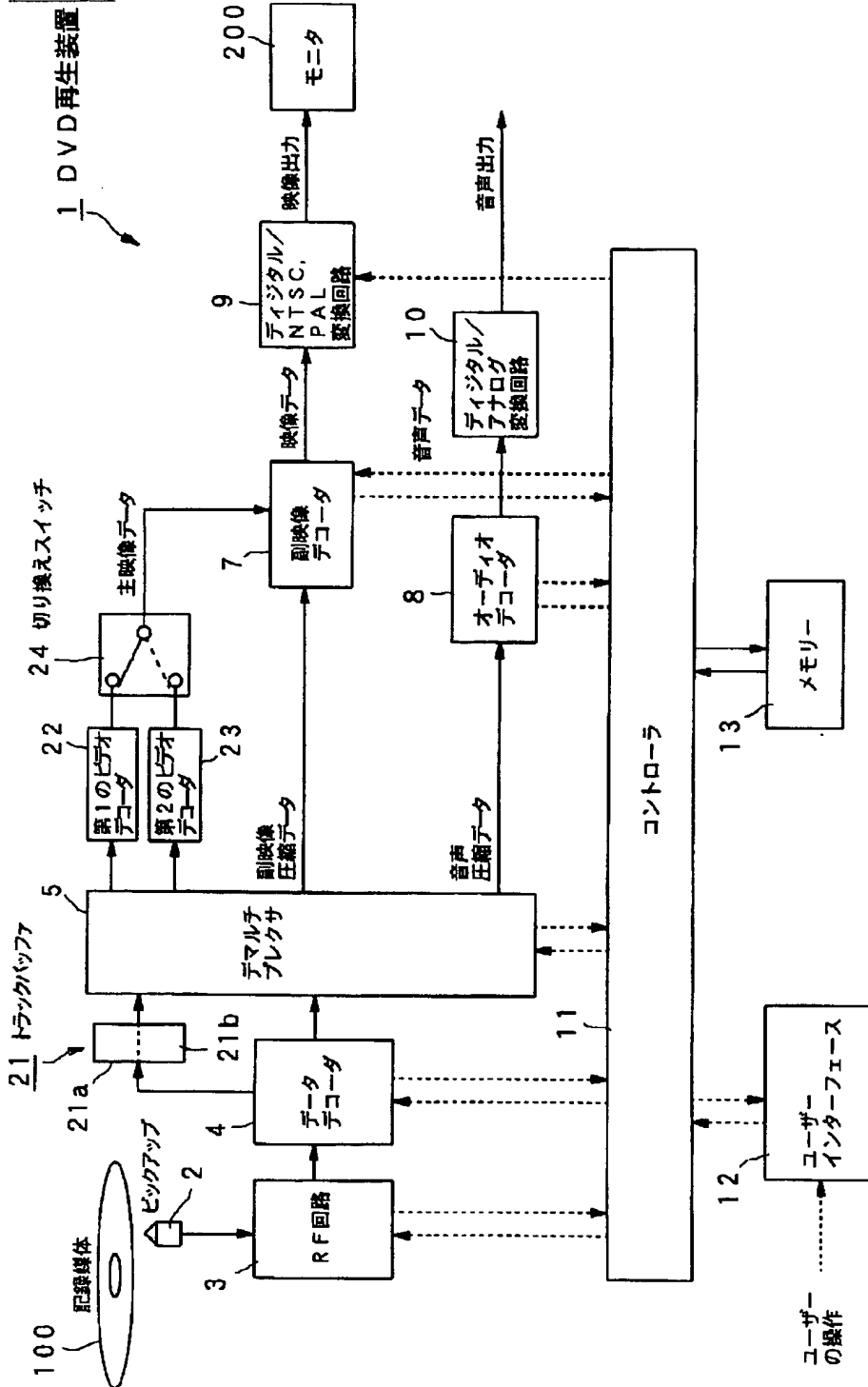
[Drawing 9]



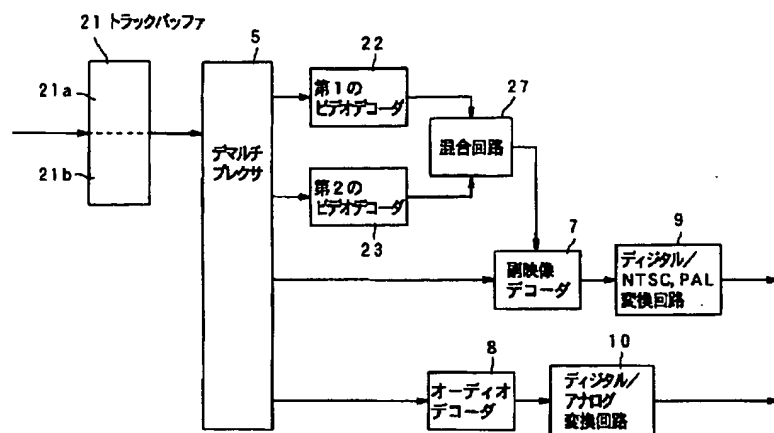
[Drawing 15]



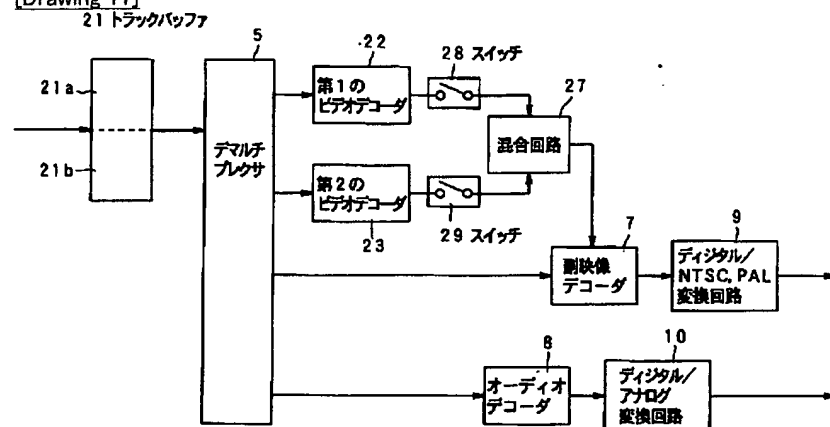
[Drawing 8]



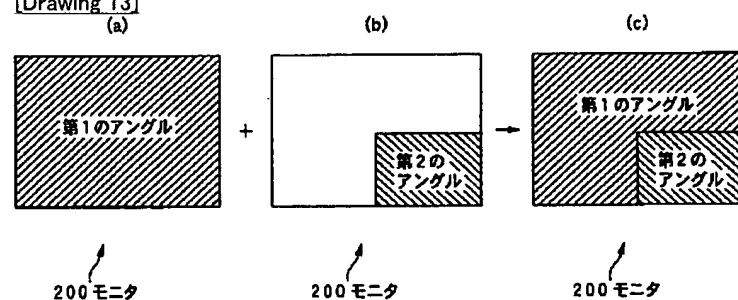
[Drawing 10]



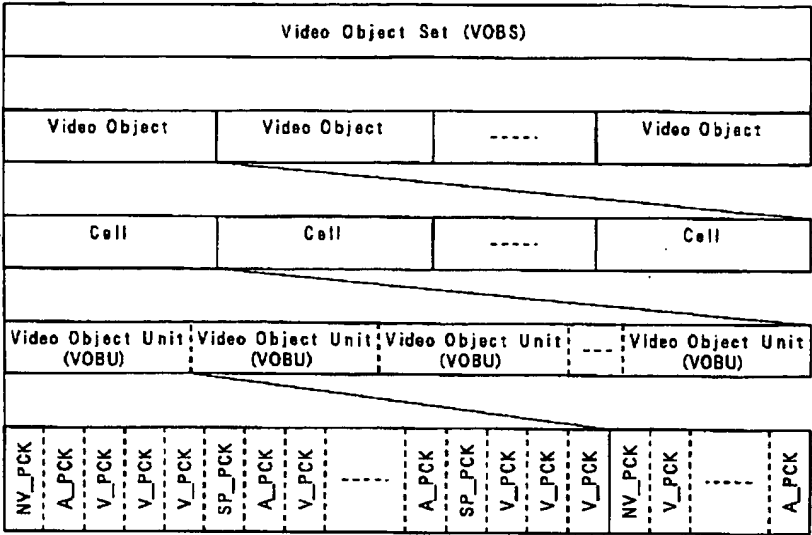
[Drawing 11]



[Drawing 13]



[Drawing 14]



[Translation done.]

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CORRECTION OR AMENDMENT

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 [Category partition] The 3rd partition of the 7th category
 [Publication date] December 2, Heisei 16 (2004. 12.2)

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 G11B 20/10
 G11B 27/00
 H04N 7/32

[F]

H04N 5/92	H
G11B 20/10	E
G11B 27/00	D
H04N 7/137	Z
G11B 27/00	D

[Procedure amendment]
 [Filing Date] December 16, Heisei 15 (2003. 12.16)
 [Procedure amendment 1]
 [Document to be Amended] Description
 [Item(s) to be Amended] Claim 10
 [Method of Amendment] Modification
 [The content of amendment]
 [Claim 10]

The read-out process which reads the coded-image data of the image of the above-mentioned two or more angle types from the record medium with which it is recorded, the image of two or more angle types being used as coded-image data, the decode process which decodes the above-mentioned coded-image data of the angle type of one of the above-mentioned two or more angle types which carried out reading appearance, and which carried out [above-mentioned] reading appearance at the process, and generates the decode image data of the above-mentioned two or more angle types,

The decode image data storage process of memorizing the above-mentioned decode image data of the angle type of one of the above-mentioned two or more angle types generated according to the above-mentioned decode process,

The storage process for a display of the storage region for indicating by division being formed, and memorizing display image data,

The control process read the display image data contain the above-mentioned decode image data which performed cutback processing to the above-mentioned decode image data memorized at the above-mentioned decode image data storage process, wrote in to the above-mentioned storage region where the above-mentioned storage process for a display has this decode image data that carried out cutback processing, and was written in this above-mentioned storage region

It ****.

The signal regeneration approach by which it is characterized.

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	27/00		D
H 0 4 N 7/32		H 0 4 N 7/137	Z
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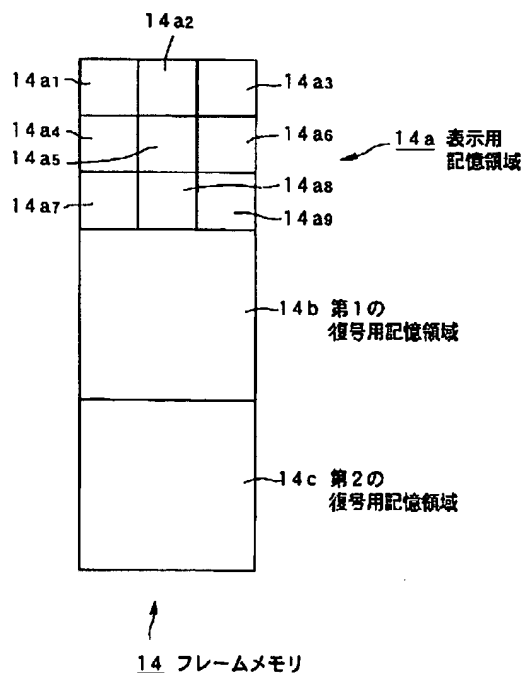
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(54) 【発明の名称】 信号再生装置及び方法

(57) 【要約】

【課題】 DVDに記録されている複数のアングルの映像を、同時に又は切り換えられても瞬時に、スムーズな映像を見ることができるDVD再生装置を提供することを目的とする。

【解決手段】 DVDを再生するDVD再生装置の復号を行う際に用いるフレームメモリ14を、9つの異なる映像、例えば9方向のアングルの映像、の表示用に対応して9つの記憶領域を形成する表示用記憶領域14aと、復号後のIピクチャー及びPピクチャー、すなわち復号画像データを記憶する第1の復号用記憶領域14b及び第2の復号用記憶領域14cとを有して構成する。



【特許請求の範囲】

【請求項 1】 複数アングルの映像が符号化画像データとされて記録されている記録媒体から、上記複数アングルの映像の符号化画像データを読み出す読み出し手段と、
上記読み出し手段で読み出した上記複数アングルの内の一のアングルの上記符号化画像データを復号して上記複数アングルの復号画像データを生成する復号手段と、
上記復号手段によって生成した上記複数アングルの内の一のアングルの上記復号画像データを記憶する復号用記憶手段と、
表示画像データを記憶し、分割表示するための記憶領域が形成される表示用記憶手段と、
上記復号用記憶手段に記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶手段の上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御手段とを備えることを特徴とする信号再生装置。

【請求項 2】 上記復号用記憶手段を少なくとも 1 つ備え、
上記符号化画像データのフレーム内符号化画像データを、1 つの上記復号用記憶手段を用いて復号して、上記記録媒体に記録されている上記複数アングルの映像を再生することを特徴とする請求項 1 記載の信号再生装置。

【請求項 3】 上記復号用記憶手段を少なくとも 2 つ備え、
上記符号化画像データのフレーム間順方向符号化画像データを、2 つの上記復号用記憶手段を用いて復号して、上記記録媒体に記録されている上記複数アングルの映像を再生することを特徴とする請求項 1 記載の信号再生装置。

【請求項 4】 上記復号用記憶手段を少なくとも 3 つ備え、
上記符号化画像データのフレーム間順方向符号化画像データを、3 つの上記復号用記憶手段を用いて復号して、上記記録媒体に記録されている上記複数アングルの映像を逆方向再生することを特徴とする請求項 1 記載の信号再生装置。

【請求項 5】 複数アングルの映像が符号化画像データとして記録されている記録媒体から、上記複数アングルの上記符号化画像データを読み出す読み出し手段と、
上記読み出し手段で読み出した上記符号化画像データを記憶する m 個の記憶手段と、
上記 m 個の記憶手段から出力された上記符号化画像データを復号して復号画像データを生成する復号手段とを備えることを特徴とする信号再生装置。

【請求項 6】 上記復号手段を m 個備え、この m 個の各復号手段によって復号して得た各アングルの上記復号画像データを切り換えスイッチによって切り換えて出力する

ことを特徴とする請求項 5 記載の信号再生装置。

【請求項 7】 上記復号手段は、m 倍の復号の処理速度を有し、上記 m 個の記憶手段から出力された上記複数アングルの符号化画像データが切り換えられて入力されることを特徴とする請求項 5 記載の信号再生装置。

【請求項 8】 上記復号手段を m 個備え、この m 個の各復号手段によって復号して得た各アングルの上記復号画像データを混合回路によって混合して出力することを特徴とする請求項 5 記載の信号再生装置。

【請求項 9】 上記 m 個の各復号手段によって復号して得た各アングルの上記復号画像データを出力制御して上記混合回路に送るスイッチを有することを特徴とする請求項 8 記載の信号再生装置。

【請求項 10】 複数アングルの映像が符号化画像データとされて記録されている記録媒体から、上記複数アングルの映像の符号化画像データを読み出す読み出し工程と、

上記読み出し工程で読み出した上記複数アングルの内の一のアングルの上記符号化画像データを復号して上記複数アングルの復号画像データを生成する復号工程と、
上記復号工程によって生成した上記複数アングルの内の一のアングルの上記復号画像データを記憶する復号画像データ記憶工程と、

分割表示するための記憶領域が形成されて、表示画像データを記憶する表示用記憶工程と、
上記復号画像データ記憶工程で記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶工程の有する上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御工程とを有することを特徴とする信号再生方法。

【請求項 11】 複数アングルの映像が符号化画像データとして記録されている記録媒体から、複数種類の上記符号化画像データを読み出す読み出し工程と、
上記読み出し工程で読み出した上記符号化画像データを記憶する m 段の記憶工程と、
上記 m 段の記憶工程から出力された上記符号化画像データを復号して復号画像データを生成する復号工程とを有することを特徴とする信号再生方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、動画像を構成する符号化画像データを復号して動画像を再生する信号再生装置及び方法に関し、特に同一の属性を有する複数の動画像を再生する信号再生装置及び方法に関する。

【0002】

【従来の技術】 光ディスクに共通する特徴として、ランダムアクセスすることが挙げられる。光ディスクである DVD（デジタルビデオディスク：DVD-VIDEO）は、この特徴を生かし、マルチアングル機能やマル

チストーリー機能などが盛り込まれている。

【0003】上記マルチアングル機能は、複数の異なるカメラアングルから同時に撮影した映像を再生する機能であって、例えば一の映像に対して複数のアングルの映像を再生可能にする機能である。

【0004】DVDは、上記複数のアングルを選択再生可能にするデータをアングルブロックとして構成している。アングルブロックは、各アングルの映像データを細切れにして、形成されるもので、DVDでは、いわゆるインターリーブ構造を採用して、各アングルブロックを混ぜて信号記録面に記録している。DVDは、このようなデータの記録構造を採用することで、上記マルチアングル機能及びマルチストーリー機能を実現させている。

【0005】DVD再生装置は、例えば、上述のようなDVDを再生して、再生中にみたいアングルの映像にリアルタイムで切り換えて再生することができる。

【0006】なお、上記アングルブロックには、2種類あり、同時進行の映像が切り換えされた際に、切れ目なく、すなわちシームレス、に他のアングルにつながる事が可能なアングルブロック（以下、SML__AG__BLKという。）と、それ以外のアングルブロック、つまりノンシームレスでしかアングルを切り換えできないアングルブロック（以下、NSML__AGL__BLKという。）とがある。

【0007】

【発明が解決しようとする課題】ところで、上記SML__AG__BLKの再生を行った場合、上記DVD再生装置は、シームレスにアングルを切り換えることはできるが、アングルを切り換えようとしてから切り替わるまで、約数秒の時間を要してしまう。つまり、上記DVD再生装置は、アングルを切り換えようとした瞬間の別のアングルの再生ができないことになる。よって、視聴者は、他のアングルの映像を見たいときに切り換えても、その切り換えた瞬間の当該他のアングルの映像を見ることはできず、みたい映像を見逃してしまう。

【0008】さらに、上記SML__AG__BLKの再生では、アングルを切り換えは、約数秒に1回に限られている。そして、全てのアングルにおいて、オーディオデータ及び字幕情報等からなる副映像データは、再生されるアングルの映像に係るものに限ってエンコードされている。

【0009】また、上記NSML__AG__BLKの再生を行った場合、上記DVD再生装置は、アングルを切り換えようとしたときに一旦再生を中止してから、別のアングルに切り替えて再生を再開しなければならない。このように各アングルがスムーズにつながらない映像は視聴者にとって見づらいものとなる。

【0010】なお、上記NSML__AG__BLKの再生では、アングルを切り換えようとした瞬間の別のアングルを再生することはできる。また、アングルを切り換え

ることが可能な場所も上記SML__AG__BLKより一般的に多い。さらに、他のアングルの映像に切り換えても、当該他のアングルの映像とは別のオーディオデータや副映像データをデコードすることができる。

【0011】上記NSML__AG__BLK及びNSML__AG__BLKの再生を行った場合、DVD再生装置は、アングルを切り換えることができたとしても、スムーズ且つ瞬時にアングルを切り換えることはできない。

【0012】また、例えば、同時に各アングルの映像表示を視聴者に提供できれば、各アングル映像を常に確認することができ、上述のように各アングルの切り換えによる映像の見逃し、見づらさを解消することができる。よって、複数のアングルの映像を同時に表示することを可能にする装置の提供も望まれる。

【0013】そこで、本発明は、上述の実情を鑑みてなされたものであって、記録媒体に記録されている複数のアングルの映像を、同時に又は切り換えられても瞬時に、スムーズな映像を見ることができ信号再生装置及び方法を提供することを目的とする。

【0014】

【課題を解決するための手段】本発明に係る信号再生装置は、上述の課題を解決するために、読み出し手段で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号手段と、復号手段によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号用記憶手段と、表示画像データを記憶し、分割表示するための記憶領域が形成される表示用記憶手段と、復号用記憶手段に記憶されている復号画像データに縮小処理を施して、この縮小処理した復号画像データを表示用記憶手段の記憶領域に書き込み、この記憶領域に書き込まれた復号画像データを含む表示画像データを読み出す制御手段とを備える。これらを備えることで、信号再生装置は、複数の復号画像データを表示用記憶手段の各記憶領域に記憶する。

【0015】また、本発明に係る信号再生装置は、上述の課題を解決するために、読み出し手段で読み出した符号化画像データを記憶するm個の記憶手段と、m個の記憶手段から出力された上記符号化画像データを復号して復号画像データを生成する復号手段とを備える。これらを備えることで、信号再生装置は、同時に又は切り換えて複数アングルの符号化画像データを復号する。

【0016】さらに、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号工程と、復号工程によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号画像データ記憶工程と、分割表示するための記憶領域が形成され

て、表示画像データを記憶する表示用記憶工程と、復号画像データ記憶工程で記憶されている復号画像データに縮小処理を施して、この縮小処理した復号画像データを表示用記憶工程の有する記憶領域に書き込み、この記憶領域に書き込まれた復号画像データを含む表示画像データを読み出す制御工程とを有する。

【0017】また、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した符号化画像データを記憶するm段の記憶工程と、m段の記憶工程から出力された符号化画像データを復号して復号画像データを生成する復号工程とを有する。

【0018】

【発明の実施の形態】以下、本発明の実施の形態について、図面を参照しながら説明する。

【0019】先ず第1の実施の形態は、本発明に係る信号再生装置及び方法を適用し、DVD（デジタルビデオディスク：DVD-VIDEO）を再生するように構成したDVD再生装置である。

【0020】なお、DVDは、MPEG2（Moving Picture Coding Experts Group 2）によって圧縮符号化された画像が記録されている記録媒体であって、画像データを構成するデータとして、フレーム内符号化画像からなるIピクチャー、フレーム間順方向予測符号化画像からなるPピクチャー、双方向予測符号化画像からなるBピクチャーとが記録されている。

【0021】上記Iピクチャーは、予測符号化を行わずに1つの画像を圧縮符号化して作られる符号化画像データであって、自らデータのみの復号によって画像を生成する。上記Pピクチャーは、1つ前のフレーム内の画像から予測符号化して作られる符号化画像データである。上記Bピクチャーは、前後のフレーム内の画像から予測符号化して作られる符号化画像データである。

【0022】すなわち、復号する際には、Iピクチャーは、他の符号化画像データを必要とせず、またPピクチャー又はBピクチャーは、他に1つ又は2つの符号化画像データを必要とする。これら符号化画像データの復号は、DVD再生装置のフレームメモリ上でデータデコーダによって行われる。

【0023】上記DVDを再生するDVD再生装置は、図1に示すように、復号を行う際に用いるフレームメモリ14を、3つの領域に分割して構成している。フレームメモリ14は、9つの異なる映像、例えば9方向のアングルの映像、の表示用に対応して9つの記憶領域を形成する表示用記憶領域14aと、復号後のIピクチャー及びPピクチャー、すなわち復号画像データを記憶する第1の復号用記憶領域14b及び第2の復号用記憶領域14cとを有して構成される。

【0024】上記第1の復号用記憶領域14a及び第2の復号用記憶領域14bには、上述のようにIピクチャー又はPピクチャーが記憶される。例えば、Pピクチャー

一の復号を行う場合、当該Pピクチャーを第1の復号用記憶領域14b又は第2の復号用記憶領域14cの何れか一方に記憶して、他方の復号記憶領域に記憶されている復号後のIピクチャー又はPピクチャーの復号画像データを用いて復号を行う。

【0025】そして、第1の復号用記憶領域14a又は第2の復号用記憶領域で復号されたIピクチャー又はPピクチャーからなる復号画像データは、縮小処理が施されて上記表示用記憶領域14a内の分割された領域に記憶される。

【0026】上記表示用記憶領域14aは、表示画像データを記憶する領域であって、9つのアングルの映像を表示するのに対応して9つの領域14a1、14a2、14a3、14a4、14a5、14a6、14a7、14a8、14a9に分割して、この各領域に上記縮小処理が施された上記復号画像データを記憶するように構成されている。

【0027】なお、表示画像データの再生によって、例えばモニタに表示用記憶領域14a内の画像データが再生される。また、表示用記憶領域14aの記憶領域の態様は、任意に選択することができる。この場合、選択された態様に形成された記憶領域に記憶された上記復号画像データは、上記表示画面データによってモニタ等の表示画面の上記記憶領域に対応した部分に画像として再生される。

【0028】例えばマルチアングル機能実行による再生では、上記各領域に同時刻のアングルの映像を構成する各復号画像データをそれぞれ記憶する。例えば、9つの領域に、第1のアングル乃至第9のアングルの映像に係る復号画像データを割り当てて記憶する。

【0029】このように構成されたフレームメモリ14を備えることで、例えばDVD再生装置は、DVDに記憶された複数のアングルの映像を構成する符号化画像データを復号して、一度にこれら復号して得た映像を例えばモニタの各表示部に表示することができる。

【0030】以下、上記フレームメモリ14について、図2に示すように構成されるDVD再生装置1を用いてさらに詳しく説明する。

【0031】DVD再生装置1は、図2に示すように、記録媒体（DVD）100からRF信号を再生するピックアップ2と、このピックアップ2により再生されたRF信号が供給されこのRF信号の2値化処理等を行うRF回路3と、RF回路3からの再生データが供給されエラー訂正等のデコード処理をするデータデコーダ4と、データデコーダ4によりデコード処理がされた再生データを主映像圧縮データ、副映像圧縮データ、音声圧縮データに振り分けるデマルチプレクサ5とを備える。

【0032】なお、上記主映像圧縮データは、上記Iピクチャー、Pピクチャー及びBピクチャー等の符号化画像データによって構成される。

【0033】また、DVD再生装置1は、上記フレーム

メモリ14を備えてデマルチプレクサ5から出力された上記主映像圧縮データを復号するビデオデコーダ6と、上記副映像圧縮データを復号して上記主映像データと合成する副映像デコーダ7と、上記音声圧縮データを復号するオーディオデコーダ8と、副映像デコーダ7からの副映像データと主映像データが合成された映像データが供給されNTSC信号又はPAL信号に変換するデジタル/NTSC、PAL変換回路(以下、単にNTSC変換回路という。)9と、オーディオデコーダ8からのオーディオデータが供給されアナログ信号に変換するデジタル/アナログ変換回路(以下、単にA/D変換回路という。)10とを備える。

【0034】さらに、DVD再生装置1は、ピックアップ2、RF回路3、データデコーダ4、デマルチプレクサ5、ビデオデコーダ6、副映像デコーダ7、オーディオデコーダ8、NTSC変換回路9及びA/D変換回路10を制御するコントローラ11と、このコントローラ11とユーザーの操作入力を媒介するユーザーインターフェース12と、コントローラ11のデータ記憶部となるメモリ13とを備える。

【0035】また、DVD再生装置1から出力されたNTSC変換回路9からのNTSC信号又はPAL信号は、モニタ200に入力されて映像化される。

【0036】なお、このDVD再生装置1が再生する記録媒体100は、図14に示すように、映画の1作品等の単位とされて、Video Object Set(以下、VOBSという。)で記録されている。

【0037】上記VOBSは、複数のVideo Object(以下、VOBという。)から構成されている。DVDは、例えば、1つの映画を複数のストーリー展開で見ることが出来るマルチストーリー機能に対応して上記VOBごとで異なるストーリー展開になるように構成されている。そして、VOBは、複数のCellにより構成される。

【0038】上記Cellは、例えば映画における1シーン等の単位となる。すなわち、この1シーン毎の組み合わせがVOBとなり、この組み合わせの違いにより上記マルチストーリー機能等を構成する。そして、Cellは、複数のVideo Object Unit(以下、VOBUという。)により構成されている。

【0039】上記VOBUは、複数の主映像圧縮データ、副映像圧縮データ及び音声圧縮データのグループから構成される。主映像圧縮データ、副映像圧縮データ又は音声圧縮データは、後述するように、デマルチプレクサ5から主映像パック(V_PCK)、副映像パック(SP_PCK)又は音声パック(A_PCK)にパック化されて出力される。

【0040】上記主映像圧縮データは、映画の主映像となるデータであって、DVDフォーマットにおけるビデオストリームを構成する。また、副映像圧縮データは、字幕等のデータであって、DVDフォーマットにおける

サブピクチャストリームを構成する。そして、音声圧縮データは、音声に関するデータであって、DVDフォーマットにおけるオーディオストリームを構成する。

【0041】ここで、MPEG2方式でいうGOP(Group of Picture)は、DVDにおいて各アングルの映像データが細切れにされてなるアングルブロックとされ、インターリーブ構造を採用して、アングルブロックを混ぜてDVDに記録されている。GOPは、例えば1VOBU内にインターリーブ構造を採用して記録されている。そして、1GOPは、通常、図15に示すように、Iピクチャー、Pピクチャー及びBピクチャーによって構成され、これらIピクチャー、Pピクチャー及びBピクチャーが合計で15枚になるように構成されている。

【0042】上記フォーマットによってデータが記録された記録媒体(DVD)100は、DVD再生装置1の備えるピックアップ2によってそのデータが読み出される。

【0043】ピックアップ2は、当該ピックアップ2に組み込まれているレーザ光源からのレーザ光を記録媒体100の信号記録面に照射して、信号記録面で反射された反射光を受光する。ピックアップ2は、受光した光に応じて再生したRF信号をRF回路3に供給する。

【0044】RF回路3は、このRF信号の波形等化及び2値化等をして再生データとその同期信号等を生成する。このRF回路3により生成されたデジタルデータ等は、データデコーダ4に供給される。

【0045】データデコーダ4は、RF回路3により生成された再生データに基づきデータの復調や誤り訂正等の処理を行う。データデコーダ4により復調等がされたデジタルデータは、デマルチプレクサ5に供給される。

【0046】ここで、デジタルデータには、主映像圧縮データが含まれている。よって、符号化画像データは、ピックアップ2、RF回路3、データデコーダ4によって記録媒体100から読み出されたことになる。

【0047】デマルチプレクサ5は、データデコーダ4によりエラー訂正のデコード処理等が施された記録媒体100から再生したデジタルデータを、各種パック、すなわち、主映像パック、副映像パック又は音声パックに分割して、後段の各デコーダに当該各パックを出力する。

【0048】なお、デマルチプレクサ5と上記データデコーダ4の処理速度を吸収するために、デマルチプレクサ5とデータデコーダ4の間にトラックバッファが設けられている。

【0049】デマルチプレクサ5は、主映像圧縮データからなる主映像パックをビデオデコーダ6に供給し、副映像圧縮パックからなる副映像パックを副映像デコーダ7に供給し、音声圧縮パックからなる音声パックをオーディオデコーダ8に供給する。

【0050】ビデオデコーダ6は、供給された主映像パック内の主映像圧縮データの復号処理を行い、この復号処理により伸長化された主映像データを生成する。ここで、主映像データは、復号されたIピクチャー、Pピクチャー、Bピクチャーとされる復号画像データである。そして、ビデオデコーダ6は、復号処理を行うために上述のフレームメモリ14を有している。

【0051】ここで、上記ビデオデコーダ6が上記フレームメモリ14を用いて行う復号処理について、例えばマルチアングル機能を実行可能に構成された例えばVOBU内の第9のマルチアングルの映像のIピクチャー又はIピクチャー及びPピクチャーを復号して、順方向再生を行う場合について説明する。なお、上記Iピクチャーの復号については、第1のVOBU、そして第2のVOBU内のIピクチャーI2を順次復号する場合について説明する。また、上記Iピクチャー及びPピクチャーの復号処理については、第1のVOBU内のIピクチャーI2、PピクチャーP5、PピクチャーP8を順次復号する場合について説明する。

【0052】Iピクチャーのみの復号を行う場合、ビデオデコーダ6は、図3(a)に示すように、入力された主映像圧縮データを構成する内のIピクチャーI2を復号してフレームメモリ14の第1の復号用記憶領域14bに記憶する。ビデオデコーダ6は、IピクチャーI2の復号を、例えば第1の復号用記憶領域14b上で書き換えながら行う。

【0053】復号後、ビデオデコーダ6は、図3(b)に示すように、復号したIピクチャーI2に縮小処理を施して、表示用記憶領域14aの第9のアングルの表示用の領域14agに当該縮小処理を施した復号後のIピクチャーI2をコピーする。

【0054】上記表示用記憶領域14aに縮小処理された記憶されたIピクチャーI2は、上記副映像デコーダ7及びNTSC変換回路9を介してモニタ200の分割された表示部に画像として映し出される。

【0055】DVD再生装置1は、復号したIピクチャーI2による生成した画像を映す一方、図3(c)に示すように、フレームメモリ14の第1の復号用記憶領域14bに、次のIピクチャー、すなわ第2のVOBU内に記録されていたIピクチャーI2を記憶する。ここで、ビデオデコーダ6は、第1のVOBUのIピクチャーI2で行ったと同様に、この第2のVOBUのIピクチャーI2を復号して、その後縮小処理を施し、表示用記憶領域14aにコピーする。

【0056】上記表示用記憶領域14aに縮小処理されてコピーされた第2のVOBUのIピクチャーI2は、モニタ200において上記第1のVOBUのIピクチャーI2の次の画像とされて映し出される。詳しくは、上述のようにビデオデコーダ6において復号して得た復号画像データ(主映像データ)は、副映像デコーダ7に供

給される。

【0057】副映像デコーダ7は、供給された副映像パック内の副映像圧縮データの復号処理を行い、この復号処理をした副映像データをビデオデコーダ6から供給された上記主映像データに合成して、映像データを生成する。すなわち、副映像デコーダ7は、副映像データとして再生される字幕データ等を上記主映像データと合成する。なお、この副映像デコーダ7は、副映像データが無い場合には、主映像データをそのまま映像データとして出力する。副映像デコーダ7は、生成した映像データをNTSC変換回路9に供給する。

【0058】NTSC変換回路9は、映像データをデジタルデータからNTSCやPAL等のテレビジョン信号に変換する。NTSC変換回路9からのテレビジョン信号は、モニタ200に映像として映し出される。

【0059】モニタ200に入力されたテレビジョン信号には、上記ビデオデコーダ6で復号されたIピクチャーI2が含まれている。また、モニタ200は、上記フレームメモリ14の表示用記憶領域14aの分割された複数の記憶領域に対応して表示画面が9つに分割表示される。ここで、分割表示は、例えば表示用記憶領域の分割態様に従う。したがって、モニタ200の表示画面が分割されてなる一の表示部に、上記IピクチャーI2に基づく映像が映し出される。

【0060】なお、オーディオデコーダ8は、音声パック内の音声圧縮データの復号処理を行い、伸長した音声データを生成する。すなわち、オーディオデコーダ8は、音声データがMP EG2方式によって圧縮されていれば、これに対応した伸長処理をして、音声圧縮データを生成する。また、オーディオデコーダ8は、MP EG2のフォーマットの他に、リニアPCM又はドルビーAC3のフォーマットであれば、これに対応した処理を行う。オーディオデコーダ8は、生成した音声データをA/D変換回路10に供給する。

【0061】A/D変換回路10は、デジタルデータである音声データをアナログの音声データに変換して出力する。この出力をスピーカ等に供給することにより、ユーザーが記録媒体100から再生した映像を視聴することができる。

【0062】コントローラ11は、ピックアップ2、RF回路3、データデコーダ4、デマルチプレクサ5、ビデオデコーダ6、副映像デコーダ7、オーディオデコーダ8、NTSC変換回路9及びA/D変換回路10の制御を行う。また、このコントローラ11には、操作パネルやリモートコントローラであるユーザーインターフェース12を介して操作入力され、この操作入力に基づき各回路の制御を行う。

【0063】このコントローラ11は、ビデオデコーダ6を介して、フレームメモリ14での書き込み制御及び読み出し制御を行う。すなわち、コントローラ11は、

フレームメモリ14の復号用記憶領域に記憶されている復号画像データの縮小処理及び当該縮小処理した一の復号画像データを表示用記憶領域14aの分割表示のために形成される一の記憶領域に書き込み制御を行う。そして、コントローラ11は、表示用記憶領域14a内に記憶された復号画像データの読み出す読み出し制御を行う。

【0064】なお、復号画像データの表示記憶領域14aからの読み出しは、表示記憶領域14a単位の表示画像データの読み出しによって行われる。表示画像データによって、上記記憶領域に200対応して上記一の記憶画像に記憶されている復号画像データによる画像がモニタの当該記憶領域に対応する表示位置に映し出される。

【0065】よって、上述の第9のアングルのIピクチャーに対して行った復号及び縮小処理を第1乃至第8のアングルのIピクチャーに対しても同様に行うことで、DVD再生装置1は、第9のアングルの映像と同時刻における第1乃至第8のアングルの映像を同時にモニタ200に映し出すことができる。この場合、例えば、各アングルの画像を構成する符号化画像データの復号は、図5(a)乃至図5(d)に示すように、第1のアングルの画像(200a)、第2のアングルの画像(200b)、・・・、第9のアングルの画像(200i) ..そして第1のアングルの画像(200a)を生成するような手順で行う。

【0066】なお、Iピクチャーを復号するだけであれば、フレームメモリ14は、上述のように少なくとも1つの復号用記憶領域を備えていればよい。

【0067】また、Iピクチャー及びPピクチャーの復号の場合については、ビデオデコーダ6は、図4(a)に示すように、入力されたIピクチャーI2が先ず復号してフレームメモリ14の第1の復号用記憶領域14bに記憶される。

【0068】復号後、ビデオデコーダ6は、図4(b)に示すように、復号したIピクチャーI2に縮小処理を施して、表示用記憶領域14aの第9のアングルの表示用の領域14agに当該縮小処理を施した復号後のIピクチャーI2をコピーする。

【0069】上記表示用記憶領域14aに縮小処理されて記憶されたIピクチャーI2によって生成された画像は、フレームメモリ14の表示用記憶領域14aに対応したモニタ200の一の表示部に映し出される。

【0070】一方、ビデオデコーダ6は、図4(c)に示すように、次に入力されたPピクチャーP5を、第1の復号用記憶領域14bに記憶されている復号後のIピクチャーI2によって予測して復号し、第2の復号用記憶領域14cに記憶する。

【0071】第2の復号用記憶領域14cに復号後のPピクチャーP5を記憶した後、ビデオデコーダ6は、図4(d)に示すように、復号したPピクチャーP5に縮

小処理を施して、表示用記憶領域14aの領域14agに当該縮小処理を施した復号後のPピクチャーP5をコピーする。

【0072】上記表示用記憶領域14aに縮小処理されて記憶されたPピクチャーP5によって生成された画像は、モニタ200の上記一の表示部に映し出されていた上記IピクチャーI2の次の画像として映し出される。

【0073】PピクチャーP8を復号する際には、ビデオデコーダ6は、図4(e)に示すように、次に入力されたPピクチャーP8を、第2の復号用記憶領域14cに記憶されている復号後のPピクチャーP5によって予測して復号し、第1の復号用記憶領域14bに記憶する。

【0074】第1の復号用記憶領域14bに復号後のPピクチャーP8を記憶した後、ビデオデコーダ6は、図4(f)に示すように、復号したPピクチャーP8に縮小処理を施して、表示用記憶領域14aの領域14agに当該縮小処理を施した復号後のPピクチャーP8をコピーする。

【0075】上記表示用記憶領域14aに縮小処理されて記憶されたPピクチャーP8によって生成された画像は、モニタ200の上記一の表示部に映し出されていた上記PピクチャーP5の次の画像として映し出される。

【0076】よって、モニタ200の上記一の表示部には、復号されたIピクチャー、Pピクチャーに基づく画像が次々に映し出されたことになる。

【0077】DVD再生装置1は、第9のアングルのIピクチャー及びPピクチャーに対して行った上述の復号及び縮小処理を第1乃至第8のアングルのIピクチャー及びPピクチャーに対しても同様に行うことで、第9のアングルの映像と同時刻における第1乃至第8のアングルの映像をモニタ200の対応した各表示部に映し出すことができる。

【0078】上述のIピクチャー又はIピクチャー及びPピクチャーのみの復号によって行う順方向再生は、例えば高速再生を実行する場合に適用される。また、通常の再生を行うのであれば、フレームメモリ14にさらに復号用記憶領域を設ければよい。

【0079】また、DVD再生装置1は、逆方向再生を行うこともでき、上述のように同時刻の第1乃至第9のアングルの映像をモニタ200に映し出すこともできる。例えば、Iピクチャーを用いた逆方向再生は、第nのVOBU内のIピクチャーを復号した後、第n-1のVOBU内のIピクチャーを復号するというように、GOP内のIピクチャーを復号して行う。

【0080】そして、Iピクチャー及びPピクチャーを用いた逆方向再生は、先ず第1の復号用記憶領域14bでIピクチャーを復号して、それをもとに第2の復号用記憶領域でPピクチャーを復号を行う。例えば、第1の復号用記憶領域14cでIピクチャーI2を復号し、そ

の復号した I ピクチャー I2 をもとに同一の VOB U 内の P ピクチャー P5 を第 2 の復号用記憶領域 14 c で復号するというように復号処理を行い、モニタ 200 への表示を復号順とは逆にする、すなわち P ピクチャー P5、I ピクチャー I2 の順序で再生することで逆方向再生を行う。

【0081】次に DVD 再生装置 1 が逆方向再生可能に構成したフレームメモリ 14 について、例えば、第 9 のアングルの映像を構成する I ピクチャー及び P ピクチャーを復号する場合について説明する。

【0082】逆方向再生可能に構成したフレームメモリ 14 は、図 6 に示すように、9 つの記憶領域を形成する表示用記憶領域 14 a と、I ピクチャー又は P ピクチャーの復号後の復号画像データを記憶する第 1 の復号記憶領域 14 b、第 2 の復号記憶領域 14 c 及び第 3 の復号用記憶領域 14 d とを有して構成される。

【0083】すなわち、逆方向再生に適用する場合は、フレームメモリ 14 にさらに第 3 の復号用記憶領域 14 d を設ける。

【0084】逆方向再生する場合、図 7 (a) に示すように、入力された I ピクチャー I2 を復号してフレームメモリ 14 の第 1 の復号用記憶領域 14 b に記憶する。

【0085】その後、ビデオデコーダ 6 は、図 7 (b) に示すように、次に入力した P ピクチャー P5 を、第 1 の復号用記憶領域 14 b に記憶されている復号後の I ピクチャー I2 を用いた予測により復号して、第 2 の復号用記憶領域 14 c に記憶する。

【0086】さらにその後、ビデオデコーダ 6 は、図 7 (c) に示すように、次に入力した P ピクチャー P8 を、第 2 の復号用記憶領域 14 c に記憶されている復号後の P ピクチャー P5 を用いた予測により復号して、第 3 の復号用記憶領域 14 d に記憶する。

【0087】そして、表示用記憶領域 14 a への各復号データのコピーは、上記復号の処理を行ったのと逆の順番で行う。すなわち、図 7 (d) に示すように、先ず第 3 の復号用記憶領域 14 d に記憶されている復号後の P ピクチャー P8 に縮小処理を施して、表示用記憶領域 14 a の第 9 のアングルの表示用の領域 14 ag に当該縮小処理を施した復号後の P ピクチャー P8 をコピーする。

【0088】次に、図 7 (e) に示すように、第 2 の復号用記憶領域 14 c に記憶されている復号後の P ピクチャー P5 に縮小処理を施して、表示用記憶領域 14 a の領域 14 ag に当該縮小処理を施した復号後の P ピクチャー P5 をコピーする。

【0089】そして、図 7 (f) に示すように、第 1 の復号用記憶領域 14 b に記憶されている復号後の I ピクチャー I2 に縮小処理を施して、表示用記憶領域 14 a の領域 14 ag に当該縮小処理を施した復号後の I ピクチャー I2 をコピーする。

【0090】上述のように、P ピクチャー P8、P ピク

チャー P5、I ピクチャー I2 を表示用記憶領域 14 a の領域 14 ag に順次コピーすることによって、DVD 再生装置 1 は、上記領域 14 ag に対応するモニタ 200 の一の表示部に、P ピクチャー P8、P ピクチャー P5、I ピクチャー I2 の画像を順次表示することができる。

【0091】なお、上述の I ピクチャー及び P ピクチャーのみの復号によって行う逆方向再生は、例えば高速逆再生を実行する場合に適用される。また、通常の逆方向再生を行うのであれば、フレームメモリ 14 に復号用記憶領域を 1 つ設ければよい。

【0092】以上、I ピクチャー又は I ピクチャー及び P ピクチャーのみの復号によって行うように構成されたフレームメモリ 14 及びこのフレームメモリ 14 を用いて逆方向再生を行う場合の説明である。

【0093】DVD 再生装置 1 は、上述のように構成したフレームメモリ 14 を備えることで、順方向再生及び逆方向再生において、同時刻における複数のアングルの映像を同時に表示することが可能になる。

【0094】これにより、例えば、シームレスな映像切り換えにおいて問題とされた切り換えの瞬時の他のアングルの映像を見逃すという問題を解消することもできる。例えば、視聴者は、シームレスな映像を見ることができ、且つ見たい他のアングルの映像も同時に見ることができ。

【0095】なお、再生するアングルの映像は、シームレスな映像ばかりでなく、ノンシームレスな映像であってもよい。

【0096】また、各アングルの映像は、例えば 1 VOB U 単位として構成され、さらに、同時刻の映像の各アングルの映像は各 VOB U 間で属性をもっている。すなわち、DVD 再生装置 1 は、各アングルの映像の再生においては、上記対応づけされた各 VOB U 内のピクチャーを復号している。

【0097】しかし、これに限定されず、DVD 再生装置 1 は、例えば、順方向再生時であって、他のアングルの映像のピクチャーを復号する場合、次の時刻に属する VOB U の上記他のアングルの映像を構成するピクチャーを復号していくこともできる。また、DVD 再生装置 1 は、逆方向再生時であって、他のアングルの映像のピクチャーを復号する場合、真の時刻に属する VOB U の上記他のアングルの画像を構成するピクチャーを復号していくこともできる。

【0098】次に第 2 の実施の形態について説明する。第 2 の実施の形態は、本発明に係る信号再生装置及び方法を適用し、DVD を再生するように構成した DVD 再生装置である。

【0099】なお、DVD は、上述の第 1 の実施の形態と同様にマルチアングル機能を有するようなデータフォーマットで構成されている。すなわち、DVD は、MP EG 2 方式を採用しており、映像を、I ピクチャー、P

ピクチャー及びBピクチャーとして圧縮符号化して記録している。以下、異なる2つのアングルの映像が記録されているDVDを再生する場合について説明する。

【0100】DVD再生装置は、図8に示すように、2個のビデオデコーダを備えて、この2個のビデオデコーダによって復号して得た復号画像データの出力を切り換えて後段の回路に出力している。

【0101】詳しくは、DVD再生装置1は、記録媒体100からRF信号を再生するピックアップ2と、このピックアップ2により再生されたRF信号がされ、このRF信号を2値化処理を行うRF回路3と、RF回路3からの再生データ等が供給され、エラー訂正等のデコード処理をするデータデコーダ4と、第1の記憶領域21a及び第2の記憶領域21bを有し、データデコーダ4から出力されたデジタルデータを記憶するトラックバッファ21と、データデコーダ4によりデコード処理がされたデジタルデータを主映像圧縮データ、副映像圧縮データ、音声圧縮データに振り分けるデマルチプレクサ5とを備える。

【0102】また、DVD再生装置1は、デマルチプレクサ5から出力された上記主映像圧縮データを復号する第1のビデオデコーダ22及び第2のビデオデコーダ23と、上記副映像圧縮データを復号して主映像データと合成する副映像デコーダ7と、上記音声圧縮データを復号するオーディオデコーダ8と、副映像デコーダ7からの副映像データと主映像データが合成された映像データが供給されNTSC信号又はPAL信号に変換するデジタル/NTSC、PAL変換回路（以下、単にNTSC変換回路という。）9と、オーディオデコーダ8からのオーディオデータが供給されアナログ信号に変換するデジタル/アナログ変換回路（以下、単にA/D変換回路という。）10とを備える。

【0103】さらに、DVD再生装置1は、ピックアップ2、RF回路3、データデコーダ4、デマルチプレクサ5、第1のビデオデコーダ22、第2のビデオデコーダ23、切り換えスイッチ24、副映像デコーダ7、オーディオデコーダ8、NTSC変換回路9及びA/D変換回路10を制御するコントローラ11と、このコントローラ11とユーザーの操作入力を媒介するユーザーインターフェース12と、コントローラ11のデータ記憶部となるメモリ13とを備える。

【0104】上記記録媒体100からRF信号を再生するピックアップ2、このRF信号を信号処理するRF回路3及びRF回路3で信号処理された再生データを復号するデータデコーダ4は、それぞれが処理速度を、通常処理の例えば2倍にすることができるよう構成している。ここで、通常処理は、記録媒体100から、例えば1つのアングルの映像分を読み込んで行った場合の処理をいう。

【0105】また、上記デマルチプレクサ5も、データ

の処理速度を、通常処理の2倍にすることができるよう構成している。これにより、デマルチプレクサ5は、入力されてくる主映像圧縮データ、副映像圧縮データ及び音声圧縮データの振り分けを上記通常処理と異なることなく行うことができる。

【0106】以下、上記DVD再生装置1の構成部分について説明する。なお、第1の実施の形態となるDVD再生装置1で説明した部分については、図2と同一の番号を付し、その説明を省略する。

【0107】DVD再生装置1は、記録媒体100に記録されている符号化画像データ等をピックアップ2、RF回路3及びデータデコーダ4を介してトラックバッファ21に入力する。

【0108】上記トラックバッファ21は、第1の記憶領域21a及び第2の記憶領域21bの2つの記憶領域を有している。トラックバッファ21は、上記各記憶領域に入力されたデジタルデータを記憶する。ここで、デジタルデータは、上述したように、デマルチプレクサ5によって分割される主映像圧縮データ、副映像圧縮データ、音声圧縮データを含んでいる。

【0109】このトラックバッファ21は、上記データデコーダ4とデマルチプレクサ5との処理速度の違いを吸収している。そして、トラックバッファ4は、デマルチプレクサ5からの転送命令によってデジタルデータを当該デマルチプレクサ5に出力する。

【0110】デマルチプレクサ5は、上述したように通常処理速度の2倍の処理速度を有している。デマルチプレクサ5は、トラックバッファ21の上記各記憶領域から出力されたデジタルデータを交互に取り込み、取り込んだデジタルデータを主映像圧縮データ、副映像圧縮データ及び音声圧縮データに分割して、第1のビデオデコーダ22又は第2のビデオデコーダ23、副映像デコーダ7及び音声デコーダ8に出力する。

【0111】第1のビデオデコーダ22及び第2のビデオデコーダ23に出力される主映像圧縮データは、いわゆる符号化画像データであって、いわゆるIピクチャー、Pピクチャー、Bピクチャーによって構成されるデータである。そして、出力は、例えば1GOP単位となるように上記各ビデオデコーダ6に対して行われる。また、上記主映像圧縮データ、副映像圧縮データ及び音声圧縮データは、パック化されてデマルチプレクサ5の後段に備えた各デコーダに供給される。

【0112】なお、第1のビデオデコーダ22及び第2のビデオデコーダ23とは、それぞれがIピクチャー、Pピクチャー、Bピクチャーの復号のために3つの復号用記憶領域を備えたフレームメモリを有している。

【0113】第1のビデオデコーダ22及び第2のビデオデコーダ23は、入力された各符号化画像データを復号する。ここで行う復号処理は、フレーム間予測によって行う。この第1のビデオデコーダ22及び第2のビデオ

オデコーダ 23 によって復号された復号画像データは、切り換えスイッチ 24 に入力される。

【0114】切り換えスイッチ 24 は、上記第 1 のビデオデコーダ 22 又は第 2 のビデオデコーダ 23 からの復号画像データの何れか一方を後段の副映像デコーダ 7 に供給する。切り換えスイッチ 24 のスイッチングは、コントローラ 11 によって行われる。

【0115】例えば、第 1 のビデオデコーダ 21 からの復号画像データの出力中に切り換えの命令を受けた場合、切り換えスイッチ 24 は、切り換え動作によって、出力するデータを第 2 のビデオデコーダ 23 からの復号画像データに切り換える。よって、上記第 1 のビデオデコーダ 22 及び第 2 のビデオデコーダ 23 で復号された符号化画像データは、この切り換えスイッチ 24 によって、何れか一方が出力されるように瞬時に切り換えられる。例えばこのようなスイッチングは、アングルの映像の切り換えの際に行われる。

【0116】上記切り換えスイッチ 24 を介して出力された復号画像データは、副映像デコーダ 7 及び NTSC 変換回路 9 を介してモニタ 200 に画像として表示される。

【0117】よって、第 2 の実施の形態となる DVD 再生装置 1 は、一のアングルの映像の再生中に他のアングルの映像に瞬時に切り換えて再生することができるため、当該切り換えた瞬間の他のアングルの映像をモニタ 200 に表示することができる。

【0118】この DVD 再生装置 1 によって、例えば、視聴者は、他のアングルの映像に切り換えた時に見たい当該他のアングルの映像を見逃すことがなくなる。

【0119】ここでいうアングルの映像は、シームレスな映像ばかりでなく、ノンシームレスな映像であってもよく、DVD 再生装置 1 は、これらの映像の種類に関係なく瞬時に切り換えて再生することができる。

【0120】なお、上記他のアングルの映像に切り換えても副映像データ及び音声データについては、例えば、上記一のアングルの映像のデータのものをを用いる。つまり、上記他のアングルの映像の副映像データ及び音声データは、上記デマルチプレクサ 5 から出力されることもなく、また、復号されることもない。

【0121】また、第 1 のビデオデコーダ 22 に入力される符号化画像データと第 2 のビデオデコーダ 23 に入力される符号化画像データとでビットレートに違いがある場合、デマルチプレクサ 5 と第 1 のビデオデコーダ 22 の間に設けられている図示しないビデオバッファの空き領域とデマルチプレクサ 5 と第 2 のビデオデコーダ 23 との間に設けられている図示しないビデオバッファの空きの容量とを、例えばコントローラ 11 によって監視して、空きの領域のあるビデオバッファにデマルチプレクサ 5 からデータを送出すればよい。なお、各ビデオバッファは、デマルチプレクサ 5 の分配処理の処理速度と

各ビデオデコーダ復号の処理速度の違いを吸収するバッファである。すなわち、このバッファを用い、一のバッファに空きがなくなったら、他のバッファにデータを送出して、ビットレートの違いを吸収する。

【0122】また、第 2 の実施の形態となる DVD 再生装置 1 に、図 9 に示すように、通常の処理速度の 2 倍の処理速度をもつビデオデコーダ 26 と、デマルチプレクサ 5 とビデオデコーダ 26 との間に設けた切り換えスイッチ 25 とを備えることもできる。

【0123】上記切り換えスイッチ 25 は、デマルチプレクサ 5 からの符号化画像データを、例えば 1 GOP 単位でビデオデコーダ 26 に出力する。この切り換えスイッチ 25 のスイッチングは、コントローラ 11 によって行われる。

【0124】例えば、一のアングルの映像に対応する符号化画像データの出力中に切り換えの命令が出された場合、切り換えスイッチ 25 は、他のアングルの映像に対応する符号化画像データを出力する。よって、この切り換えスイッチ 25 の切り換え動作によって、一のアングルの映像に対応する符号化画像データ又は他のアングルの映像に対応する符号化画像データの何れか一方が出力される。

【0125】上記ビデオデコーダ 26 は、切り換えスイッチ 25 からの符号化画像データを通常の 2 倍の処理速度で復号処理を行うことができる。そして、ビデオデコーダ 26 で復号して得た復号圧縮データは、副映像デコーダ 7 及び副映像デコーダ 7 及び NTSC 変換回路 9 を介してモニタ 200 に画像として表示される。

【0126】よって、上記切り換えスイッチ 25 及び 2 倍の復号処理をもつビデオデコーダ 26 を備えることでも、DVD 再生装置 1 は、シームレスな映像で且つ瞬時に映像のアングルを切り換えることができる。

【0127】次に第 3 の実施の形態について説明する。この第 3 の実施の形態は、本発明に係る信号再生装置及び方法を適用し、DVD を再生するように構成した DVD 再生装置である。

【0128】この第 3 の実施の形態となる DVD 再生装置は、複数のアングルの映像を同時に再生するように構成している。そのため、この DVD 再生装置は、図 10 に示すように、デマルチプレクサ 5 からの主映像圧縮データがそれぞれ入力される第 1 のビデオデコーダ 23 及び第 2 のビデオデコーダ 24 と、この第 1 のビデオデコーダ 22 及び第 2 のビデオデコーダ 23 からそれぞれ出力された復号画像データを混合する混合回路 27 とを有している。

【0129】すなわち、第 3 の実施の形態となる DVD 再生装置 1 は、第 2 の実施の形態として用いた DVD 再生装置 1 における切り換えスイッチ 24 に代えて混合回路 27 を備える構成を採る。

【0130】このように構成された DVD 再生装置 1

は、混合回路27によって、第1のビデオデコーダ22から出力された復号画像データと第2のビデオデコーダ23から出力された復号画像データとを混合してモニタ200に供給することができるようになる。

【0131】例えば、第1のビデオデコーダ22から第1のアングルの映像を構成する復号画像データが出力され、第2のビデオデコーダ23から第1のアングルの映像を構成する復号画像データが出力された場合、図12(a)乃至図12(b)に示すように、第1のアングルの画像(図12(a)に示す。)と第2のアングルの画像(図12(b)に示す。)とを同時に表示(図12(c)に示す。)することができる。

【0132】なお、図12(c)に示すように、モニタ200の画面内において第1のアングルの画像と第2のアングルの画像とが重ならないようにするのであれば、DVD再生装置1は、第1のビデオデコーダ23と第2のビデオデコーダ24とで3つの復号用記憶領域からなるフレームメモリを共有することができる。

【0133】また、フレームメモリを第1のビデオデコーダ22及び第2のビデオデコーダ23の各々が備えることによって、図13(a)乃至図13(b)に示すように、第1のアングルの画像(図13(a)に示す。)をモニタ200の表示画面全体を使い、また第2のアングルの画像(図13(b)に示す。)をモニタ200の表示画面の一部を使い表示(図13(c)に示す。)することもできる。

【0134】また、DVD再生装置1は、3つの復号用記憶領域からなるフレームメモリを用いることで、Iピクチャー、Pピクチャー及びBピクチャーを復号することができ、通常の再生が可能になる。

【0135】よって、DVD再生装置1は、上述のように2つのビデオデコーダを備えたときと同様に、同時に2つ異なるアングルの映像を通常再生することができ、当該通常再生した2つの異なるアングルの映像をモニタ200に表示することができる。

【0136】次に第4の実施の形態について説明する。この第4の実施の形態は、本発明に係る信号再生装置及び方法を適用し、DVDを再生するように構成したDVD再生装置である。

【0137】この第4の実施の形態となるDVD再生装置は、複数のアングルの映像を同時に再生することができ、またシームレス且つ瞬間的に再生中のアングルの映像を切り換えることができるように構成している。そのため、このDVD再生装置は、図11に示すように、デマルチプレクサ5からの主映像圧縮データがそれぞれ入力される第1のビデオデコーダ22及び第2のビデオデコーダ23と、この第1のビデオデコーダ22及び第2のビデオデコーダ23からそれぞれ出力された復号画像データを混合する混合回路27と、第1のビデオデコーダ22から出力される復号画像データについて混合回路

27に対して送出をオン及びオフするスイッチ28と、第2のビデオデコーダ23から出力される復号画像データについて混合回路27に対しての送出をオン及びオフするスイッチ29とを有している。

【0138】このように構成したDVD再生装置1は、スイッチ28及びスイッチ29をオンにした状態では、混合回路27によって、第1のビデオデコーダ22から出力された復号画像データと第2のビデオデコーダ23から出力された復号画像データとを混合してモニタ200に供給することができる。例えば、混合された映像が、図12(c)及び図13(c)に表示されるように、DVD再生装置1は、モニタ200に供給することができる。

【0139】さらに、DVD再生装置1は、スイッチ28及びスイッチ29のオン/オフの操作によって、第1のビデオデコーダ22及び第2のビデオデコーダ23を切り換えて符号化画像データの復号を行うこともできる。この場合、スイッチ28がオンのときスイッチ29をオフにして、またスイッチ28がオフのときスイッチ29をオンにする。

【0140】例えば、第1のビデオデコーダ22からの一のアングルの映像を構成する復号画像データの出力中に切り換えの命令が出された場合、スイッチ28をオフにして、一方でスイッチ29をオンにすることで、第2のビデオデコーダ23から他のアングルの映像を構成する復号画像データを出力することができるようになる。すなわち、上記第1のビデオデコーダ22及び第2のビデオデコーダ23で復号された画像圧符号化データの何れか一方が瞬時に切り換えられて出力される。

【0141】よって、DVD再生装置1は、一のアングルの映像の再生中に他のアングルの映像に瞬時に切り換えて再生することができ、当該切り換えた他のアングルの映像をモニタ200に表示することができる。

【0142】以上のことから第4の実施の形態となるDVD再生装置1は、複数のアングルを同時に再生すること、またシームレスな映像であっても瞬時に他のアングルの映像に切り換えることもできる。

【0143】このDVD再生装置1によって、例えば、視聴者は、他のアングルの映像を同時に見ることができ、さらに切り換え操作によって他のアングルの見たいときでも、切り換えたときに見たいアングルの映像を見逃すことがなくなる。

【0144】なお第2乃至第4の実施の形態となるDVD再生装置1を、2つのアングルの映像が記録されたDVDの再生を例に挙げて説明したが、3つ以上、例えば複数 m のアングルの映像が記録されているDVDを再生することもできる。この場合、DVD再生装置1は、2個及び2倍の処理速度をそれぞれ m 個及び m 倍の処理速度になるように各部を構成する。

【0145】

【発明の効果】本発明に係る信号再生装置は、読み出し手段で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号手段と、復号手段によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号用記憶手段と、表示画像データを記憶し、分割表示するための記憶領域が形成される表示用記憶手段と、復号用記憶手段に記憶されている復号画像データに縮小処理を施して、この縮小処理した復号画像データを表示用記憶手段の記憶領域に書き込み、この記憶領域に書き込まれた復号画像データを含む表示画像データを読み出す制御手段とを備えることで、符号化画像データによって構成される複数のアングルの映像を同時に再生することができる。

【0146】よって、上記信号再生装置は、例えば、ノンシームレスであるか否かに関わらず映像を同時に提供することができ、視聴者は、見たい映像を見逃すこともなくなる。

【0147】また、本発明に係る信号再生装置は、読み出し手段で読み出した符号化画像データを記憶するm個の記憶手段と、m個の記憶手段から出力された上記符号化画像データを復号して復号画像データを生成する復号手段とを備えることで、複数の符号化画像データを復号して、瞬時に切り換えて又は同時に、複数のアングルの映像を再生することができる。

【0148】そして、上記信号再生装置は、例えば、シームレスな映像の再生においても、瞬時に他のアングルの映像に切り換えることができる。

【0149】さらに、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した複数アングルの内の一のアングルの符号化画像データを復号して複数アングルの復号画像データを生成する復号工程と、復号工程によって生成した複数アングルの内の一のアングルの復号画像データを記憶する復号画像データ記憶工程と、分割表示するための記憶領域が形成されて、表示画像データを記憶する表示用記憶工程と、復号画像データ記憶工程で記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶工程の有する上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御工程とを有することで、符号化画像データによって構成される複数のアングルの映像を同時に再生することができる。

【0150】よって、上記信号再生方法によれば、例えば、ノンシームレスであるか否かに関わらず映像を同時に提供することができ、視聴者は、見たい映像を見逃すこともなくなる。

【0151】また、本発明に係る信号再生方法は、上述の課題を解決するために、読み出し工程で読み出した符号化画像データを記憶するm段の記憶工程と、m段の記

憶工程から出力された符号化画像データを復号して復号画像データを生成する復号工程とを有することで、複数の符号化画像データを復号して、瞬時に切り換えて又は同時に、複数のアングルの映像を再生することができる。

【0152】そして、上記信号再生方法によれば、例えば、シームレスな映像の再生においても、瞬時に他のアングルの映像に切り換えることができる。

【図面の簡単な説明】

【図1】本発明の第1の実施の形態となるDVD再生装置の備えるフレームメモリを示す構成図である。

【図2】上記DVD再生装置を示す回路図である。

【図3】上記フレームメモリにおいて、符号化画像データを復号するとき、特にIピクチャーを復号する様子を示す構成図である。

【図4】上記フレームメモリにおいて、符号化画像データを復号するとき、特にIピクチャー及びPピクチャーを復号する様子を示す構成図である。

【図5】符号化画像データを復号する手順の説明に用いたモニタを示す平面図である。

【図6】逆再生用に構成した上記フレームメモリを示す構成図である。

【図7】上記逆再生用に構成したフレームメモリにおいて、符号化画像データを復号するとき、特にIピクチャー及びBピクチャーを復号する様子を示す構成図である。

【図8】本発明の第2の実施の形態となるDVD再生装置を示す回路図である。

【図9】上記第2の実施の形態となるDVD再生装置の要部を変更した場合を示す回路図である。

【図10】本発明の第3の実施の形態となるDVD再生装置の要部構成を示す回路図である。

【図11】本発明の第4の実施の形態となるDVD再生装置の要部構成を示す回路図である。

【図12】複数のアングルの画像が表示されているモニタを示す平面図である。

【図13】複数のアングルの画像が他の表示の仕方に表示されているモニタを示す平面図である。

【図14】上記第1乃至第4の実施の形態となるDVD再生装置によって再生されるDVDを示すデータフォーマットである。

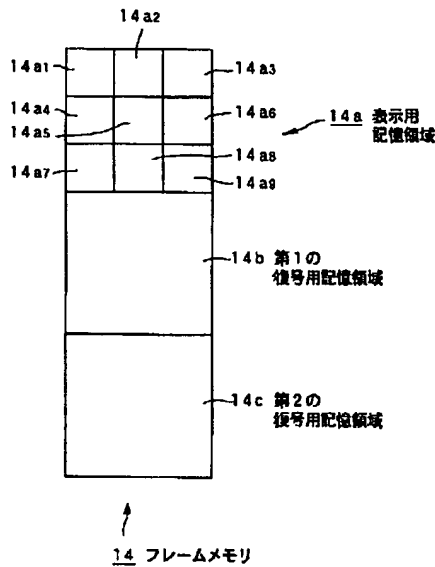
【図15】上記DVDに記録されているGOPを示すデータフォーマットである。

【符号の説明】

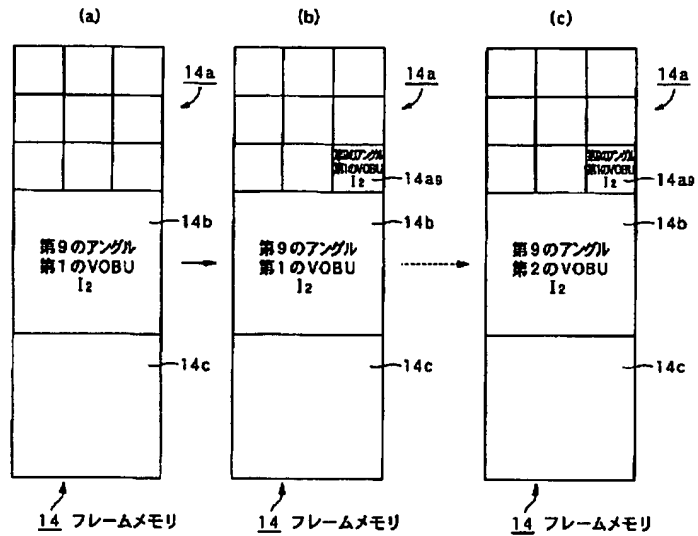
1 信号再生装置、2 ピックアップ、3 RF回路、4 データデコーダ、5 デマルチプレクサ、14 フレームメモリ、14a 表示用記憶領域、14b 第1の復号用記憶領域、14c 第2の復号用記憶領域、14d 第3の復号用記憶領域、21 トラックバッファ、22 第1のビデオデコーダ、23 第2のビデオデ

コーダ、24 切り換えスイッチ、25 切り換えスイッチ、29 スイッチ
 ッチ、26 ビデオデコーダ、27 混合回路、28

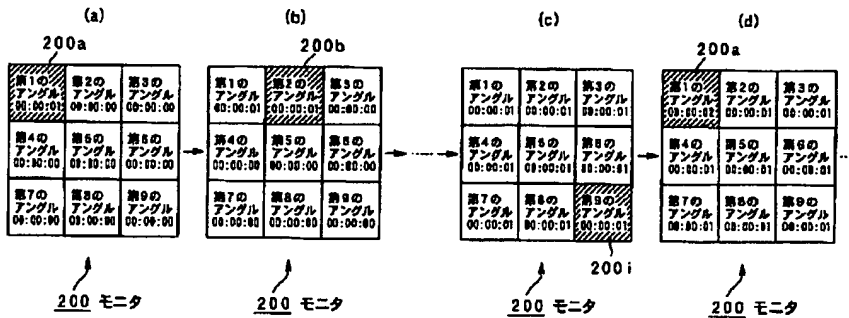
【図1】



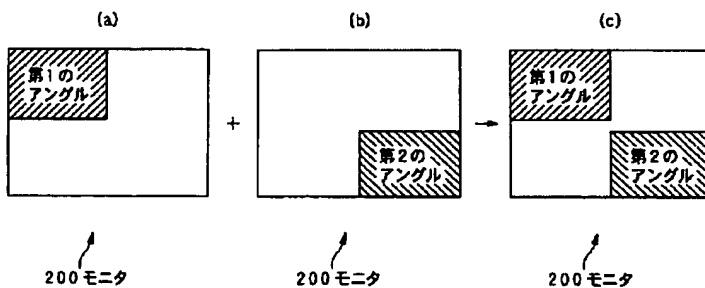
【図3】



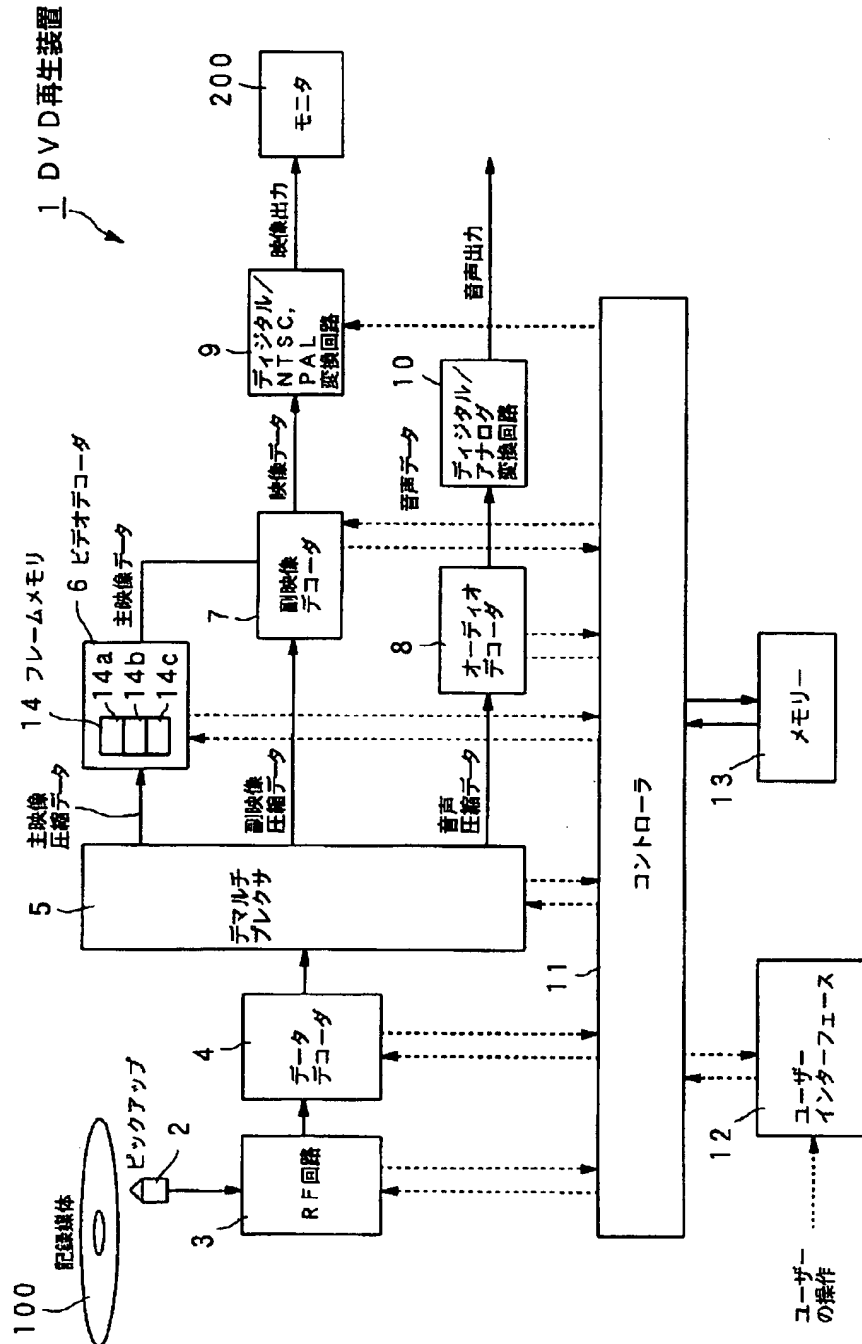
【図5】



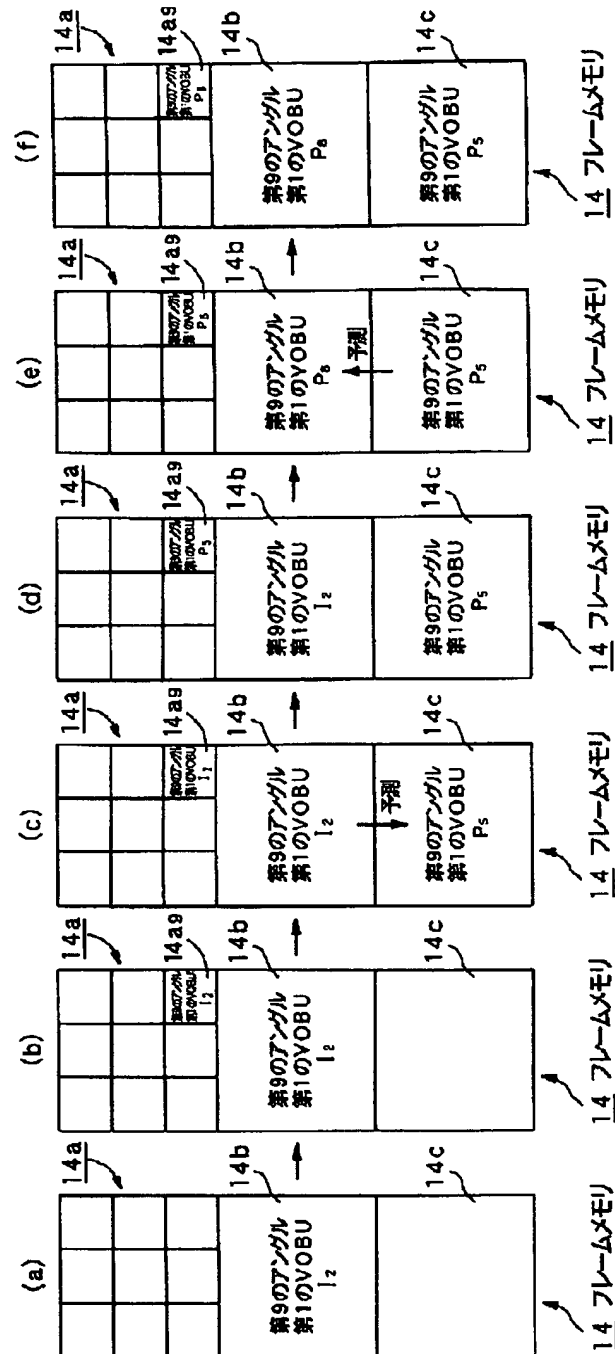
【図12】



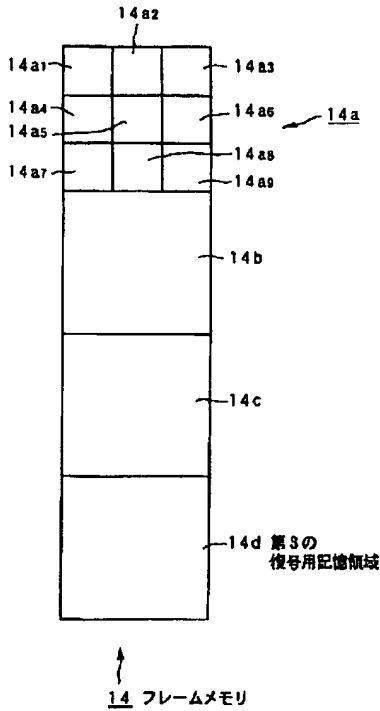
【図2】



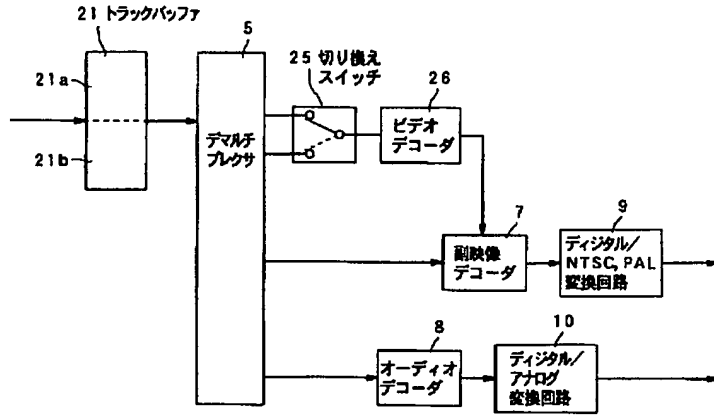
【図4】



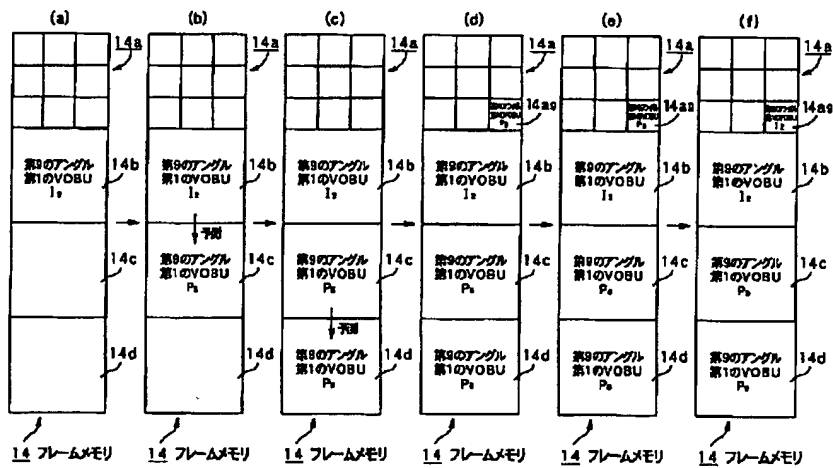
【図6】



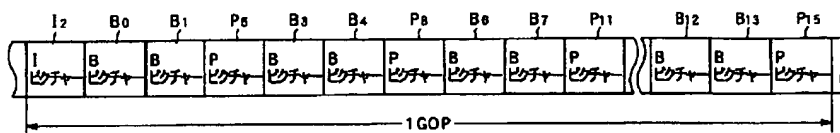
【図9】



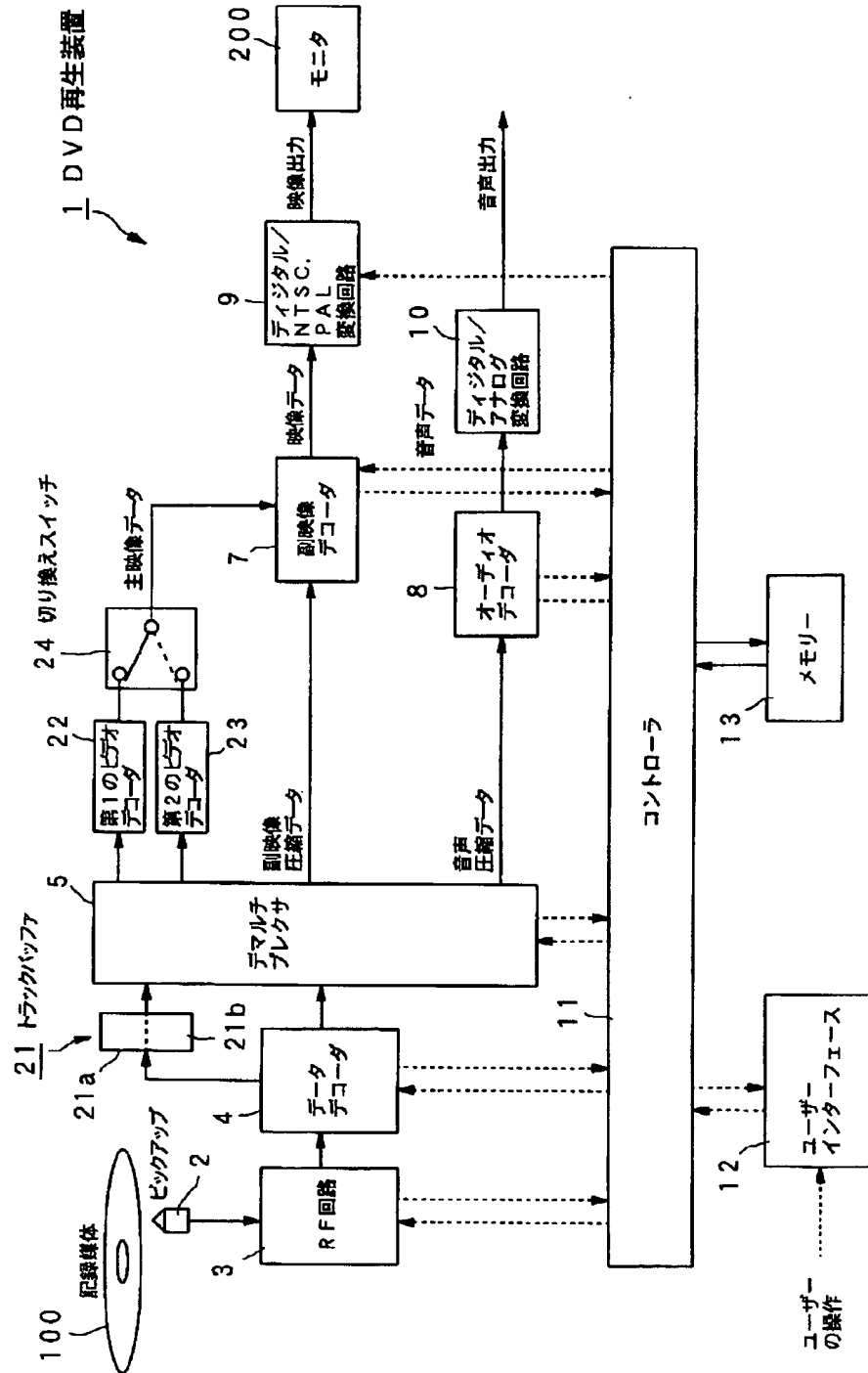
【図7】



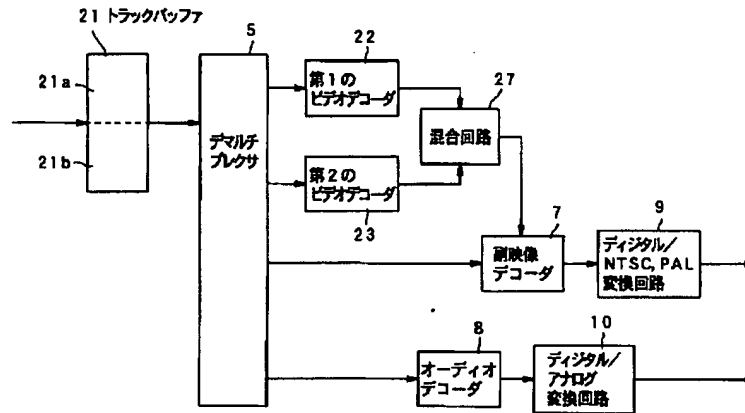
【図15】



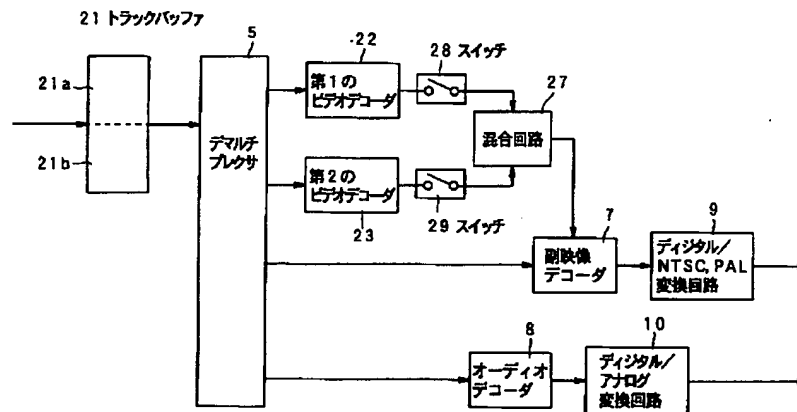
【図8】



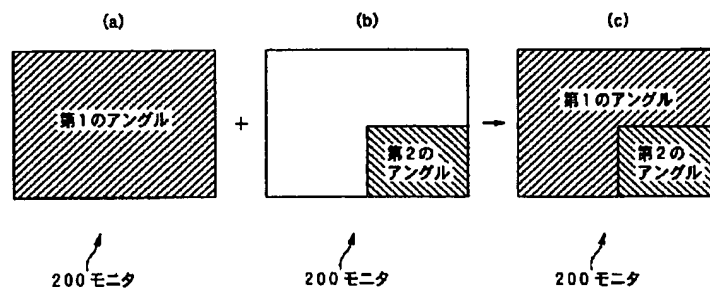
【図10】



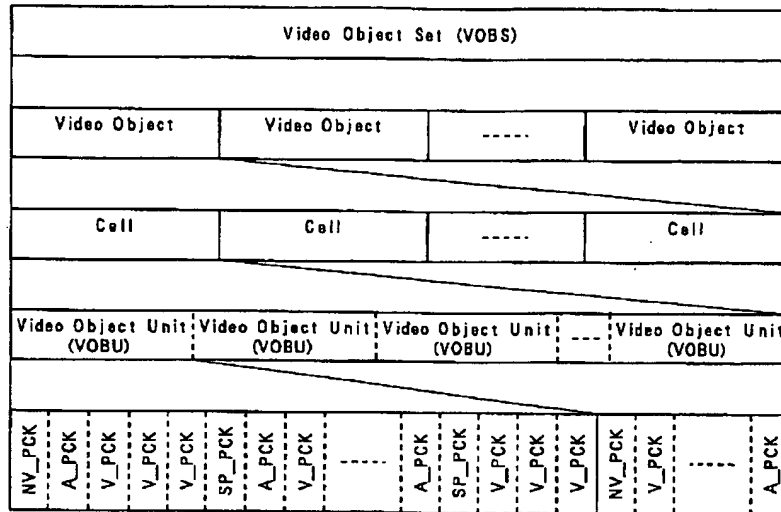
【図11】



【図13】



【図14】



【公報種別】特許法第17条の2の規定による補正の掲載
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【手続補正書】
 【提出日】平成15年12月16日(2003.12.16)
 【手続補正1】
 【補正対象書類名】明細書
 【補正対象項目名】請求項10
 【補正方法】変更
 【補正の内容】
 【請求項10】

複数アングルの映像が符号化画像データとされて記録されている記録媒体から、上記複数アングルの映像の符号化画像データを読み出す読み出し工程と、
 上記読み出し工程で読み出した上記複数アングルの内の一のアングルの上記符号化画像データを復号して上記複数アングルの復号画像データを生成する復号工程と、
 上記復号工程によって生成した上記複数アングルの内の一のアングルの上記復号画像データを記憶する復号画像データ記憶工程と、
 分割表示するための記憶領域が形成されて、表示画像データを記憶する表示用記憶工程と、
 上記復号画像データ記憶工程で記憶されている上記復号画像データに縮小処理を施して、この縮小処理した復号画像データを上記表示用記憶工程の有する上記記憶領域に書き込み、この上記記憶領域に書き込まれた上記復号画像データを含む表示画像データを読み出す制御工程と
 を有すること
 を特徴とする信号再生方法。

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